Cytec Industries Inc.

Fortier Manufacturing Complex

Waggaman, Louisiana
Jefferson Parish

EPA I.D. No. LAD 008175390

Hazardous Waste
Permit Application

Volume IV

June, 1998

Summary of Contents

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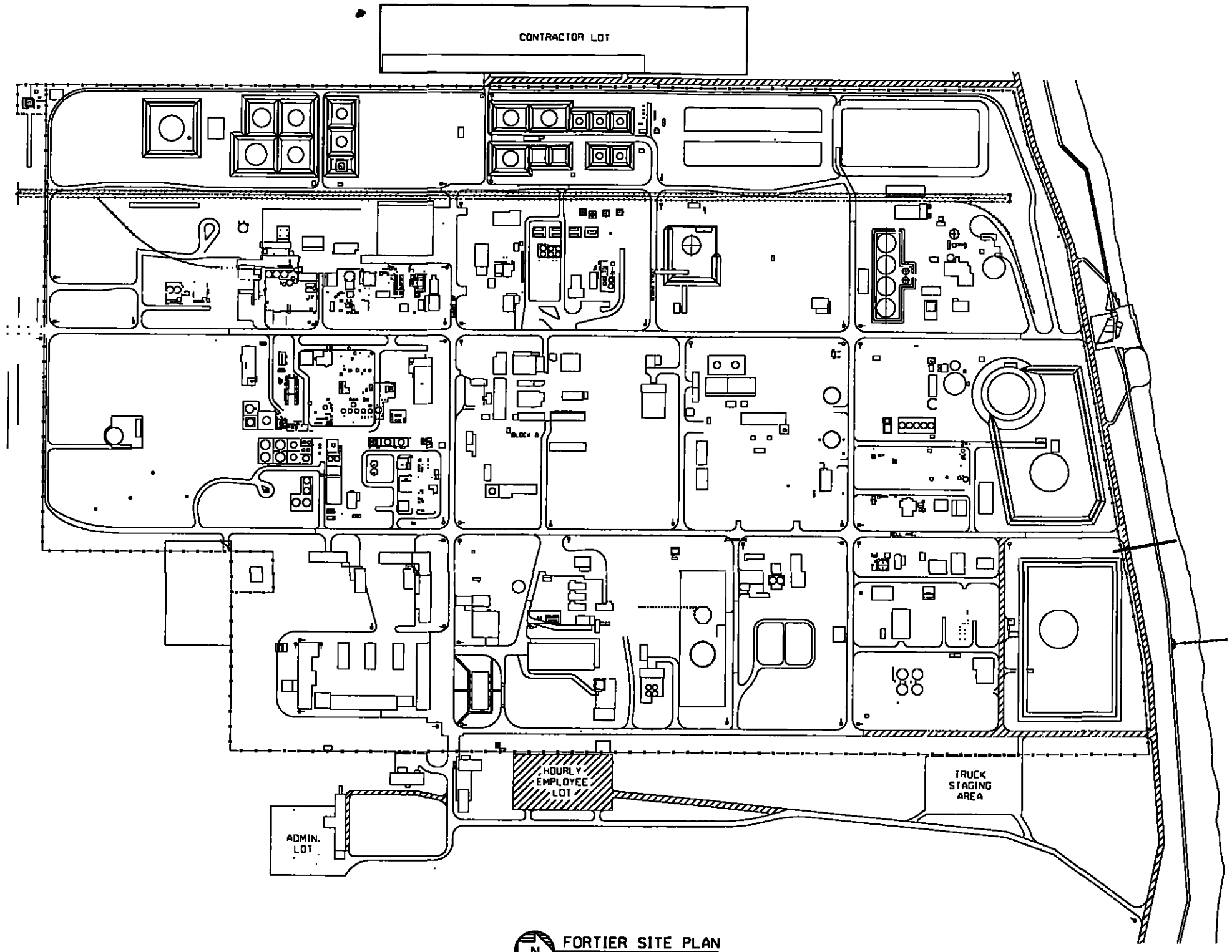
Volume IV

Appendix R

LAC 33:V.517.K

Cytec Drawing No. 36-8-08
Road Surface and Traffic Control



REQUIRED BY: LAC33:V.517.A

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CHK. DEPT. / MAT. ENGR. / PROJ. ENGR. / TECH. DEPT. / PROD. SUP. (CONT.)

CYTEC FORTIER PLANT

PCA NO.
AUTHORIZATION NO.

SEWAGE PLOT PLAN
CYTEC INDUSTRIES INC. FORTIER SITE PLAN
ROAD SURFACE AND TRAFFIC CONTROL
WAGGAMAN, JEFFERSON PARISH, LA. *LA0229815*

THIS DRAWING MAY NOT BE USED FOR CONSTRUCTION UNTIL DATED AND SIGNED BY CHECKED AND APPROVED

DRAWING NO. K-4113
NEW / NOTED 11/26/97

SHEET 36 OF 8 DRAWING NO. 08 ISSUE NO. P1

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Appendix S

LAC 33:V.517.L
LAC 33:V.1515

Training Plan

Fortier Plant Waggaman, La.	Dept: Environmental	Number: ES-04
	Date: May 29, 1998	Issue No. 0
	Title: Hazardous Waste Personnel Training Program	Supersedes: New Page: 1 of 8

Prepared by:	Reviewed by:	Approved by:
Stacy M. Foret	Anita R. Junker	John Schneller/RE Martin
Stacy M. Foret Process Owner - Hazardous Waste	Anita R. Junker Environmental Team Leader	John Schneller Director - Safety, Environmental and Technology

Update Responsibility : Process Owner - Hazardous Waste
Implementation Responsibility: Responsible Care Coordinator

Distribution List

Copy No.	Location
1	SET Department
	Copies can be accessed through the Cytec Fortier Plant Intranet.

Reference Documents: LAC 33:V.517.L, LAC 33:V.1119, LAC 33:V.1515 and Cytec SHE Standard No. 8, Cytec SHE Standard No. 18 and Fortier Plant Safety Standard No. S-6.
File R:\HW\PERMIT\TRAINING.WPD

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1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this standard is to outline the introductory and continuing training programs that prepare persons to properly manage hazardous waste. It will also prepare persons to operate and maintain the hazardous waste treatment, storage and disposal units at the Fortier Plant in a safe manner and in compliance with applicable regulatory requirements.

1.2 SCOPE

The requirements of this standard apply to persons employed in positions at the Fortier Plant related to hazardous waste management.

1.3 DEFINITIONS

Training -- The process of facilitating an employee's acquisition of the knowledge, skills and behaviors required for the job.

Refresher Training -- Training in a subject which is less comprehensive than the initial training and which is designed to assure persons already trained maintain the necessary knowledge.

2.0 REQUIREMENTS

2.1 TRAINING PROGRAM

2.1.1 The Fortier Plant has a training program consisting of introductory and continuing training, which include classroom and/or on-the-job training. The training program is intended to be flexible in order to provide employees with the appropriate type and amount of training for the position as it relates to the management of hazardous waste.

2.1.1.1 Introductory New Hire Safety and Environmental Orientation - Newly-hired employees shall receive safety and environmental orientation prior to performing any job assignments. Appendix I provides a list of suggested training topics for the new hire orientation. This list is subject to revision and should be supplemented with additional subjects, as appropriate.

2.1.1.2 Continuing Safety and Environmental Training - Continuing safety and environmental training shall be given to all employees, as applicable to their respective job position. Appendix II provides a list of suggested training topics. This list is subject to revision and should be supplemented with additional subjects, as appropriate.

2.1.2 At a minimum, the training program is designed to ensure that the Fortier Plant personnel are able to respond effectively to emergencies associated with hazardous waste and hazardous waste management units by familiarizing them with emergency procedures, emergency equipment, and emergency systems, including, where applicable:

- procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment
- key parameters for automatic waste feed cut-off systems;
- communications or alarm systems;
- response to fires or explosions;
- response to groundwater contamination incidents; and
- shutdown of operations.

2.2 TRAINING FREQUENCY

2.2.1 Facility personnel must successfully complete the introductory training program, and other training as deemed necessary, within six (6) months after the date of their employment or assignment to a position related to the management of hazardous waste.

2.2.2 Employees must not work unsupervised in positions related to the management of hazardous waste until they have completed the training requirements.

2.2.3 Training sessions shall be conducted at regular intervals for personnel in routine plant operations related to hazardous waste management.

2.2.4 Facility personnel must take part in an annual review of the initial hazardous waste training, as applicable to their jobs.

2.2.5 Training sessions shall be conducted at regular intervals to inform and train the plant emergency response team, representatives of local fire and police departments, and contract emergency response teams, as applicable, of the following information:

- plant layout;
- location of possible hazards;
- emergency equipment location and operation;
- evacuation plan and route;
- power and waste stream cut-offs;
- communications equipment and phone numbers of all required contacts; and
- other critical information and procedures.

2.3 TRAINER QUALIFICATIONS

2.3.1 This training program must be instructed by a person trained in hazardous waste management procedures. Trainers shall have satisfactorily completed a training program or have the academic credentials and instructional experience necessary for teaching the subjects. Training may be accomplished using computer based programs, video conferences, or other multi media mediums.

2.3.2 Trainers should be required to maintain professional competency by participating in continuing education or professional development programs.

2.4 DOCUMENTATION

2.4.1 The job title for each position at the facility related to hazardous waste management and the name of the employee filling each job must be maintained at the facility.

2.4.2 A written job description for each position at the facility related to hazardous waste management must be maintained at the facility. This description may be consistent in its degree of specificity with descriptions for other similar positions in the same company location or bargaining unit. This description must include the requisite skill, education, or other qualifications and duties of employees assigned to each position.

2.4.3 A written description of the type and amount of both introductory and continuing training given to each person filling a position at the facility related to hazardous waste management must be maintained at the facility.

2.4.4 Records must be maintained at the facility to document the training and/or job experience required by this standard, which have been given to and completed by facility personnel.

2.5 RECORDS RETENTION

2.5.1 Training records must be kept for at least three (3) years from the date the employee last worked at the facility.

2.5.2 Personnel training records may accompany personnel transferred within the same company.

2.5.3 Training records on current personnel must be kept until closure of the facility.

2.5.4 Training records may be in a paper or electronic format.

3.0 RESPONSIBILITIES

3.1 The Fortier Plant Manager or Director shall be ultimately responsible and accountable for the implementation and compliance with this standard.

3.2 The Unit/Department is responsible for ensuring that employees in the respective unit are trained for positions related to the management of hazardous waste as deemed appropriate.

3.3 The Operator/Employee is responsible for attending the training session and comprehending the subject matter as it relates to hazardous waste management.

3.4 The Environmental Department is responsible for ensuring that the applicable standards related to hazardous waste management are reviewed as required, and updated, as necessary. The Environmental Department is also responsible for ensuring that all revisions are distributed appropriately.

3.5 The Responsible Care Coordinator is responsible for assisting the Unit/Department in identifying the employees requiring training and determining the appropriate level of training for each employee. The Responsible Care Coordinator is also responsible for training on the subject matter related to hazardous waste management or scheduling a guest trainer.

3.6 The Safety Department is responsible for reviewing and updating applicable standards and assisting the Environmental Department in preparing, providing and maintaining the Hazardous Waste Personnel Training Program. The Safety Department is also responsible for training on subject matter related to safety and emergency procedures, as appropriate.

3.7 The Employee Relations Department is responsible for maintaining and, upon request, providing the most current written job descriptions for positions at the Fortier Plant.

3.8 Contractors must comply with all applicable regulatory requirements.

APPENDIX I.
INTRODUCTORY NEW-HIRE SAFETY AND ENVIRONMENTAL ORIENTATION SUGGESTED TRAINING TOPICS

Safety and Health

- Cytec Fortier Plant Safety Policies/Procedures
- Cytec Fortier Plant Safety Performance
- General Plant Safety Rules/Orientation
- Substance Abuse Policy
- Medical Services
- Injury, Illness, Incident Reporting Procedures
- Emergency Evacuation Procedures
- Responsible Care
- Community Responsibilities
- Plant Safety and Industrial Hygiene Programs
- Employee Monitoring
- Access to Exposure and Medical Records
- Overview of Plants, Processes and Products
- Plant Tour
- Back Safety
- Introduction to P&ID's
- Process Chemistry
- Handling Flammables/Grounding
- Ventilation Systems
- Hazard Communication
- Occupational Noise
- Right to Know - Tier II Report
- Recognizing Production Equipment
- DOT Awareness Training
- Hand Safety
- Steam Use and Safety
- Bloodborne Pathogens
- Protective Equipment Notification System
- Process Safety Management
- Respiratory Protection / Fit Test
- Hot Work Permit Procedure
- Confined Space Entry Procedure
- Line Breaking Procedure
- Equipment Lockout and Tagging Procedure
- Safety Work Permit Procedure
- Personnel Safety Equipment
- Lifting
- Protective Suits
- Fire Protection Systems (Fixed)
- Fire Extinguishers
- HAZWOPER
- Safety Shoes
- Hand Tools
- Portable Emergency Equipment

Environmental

- Cytec Fortier Plant Environmental Philosophy
- Environmental Policy and Program Overview
- Environmental Laws/Regulations Affecting Plant Operations
- Emission Reductions
- Pollution Prevention
- Waste Minimization
- Toxic Chemical Release Inventory
- Air Pollution Control
- Non-Hazardous Wastewater (NPDES/LPDES)
- Deepwells
- Hazardous Waste Management
- Spill Prevention, Control and Countermeasures
- Waste Disposal
- Recycling
- Environmental Incident Response

APPENDIX II.
CONTINUING SAFETY AND ENVIRONMENTAL SUGGESTED TRAINING TOPICS

- Accident Prevention Signs and Tags
- Facility Entry and Exit Procedures
- Safety Work Permits
- Hot Work Permit Procedure
- Equipment Lockout and Tagging Procedure
- Confined Space Entry
- Line Breaking and Opening Lines
- Department Building Alarm System
- Safety Shower and Eye Wash Units
- Locate, Read, Understand Material Data Safety Sheets Applicable to Job
- Self Contained Breathing Apparatus
- Hearing Protection/Conservation
- Fire Water System/Fire Extinguishers
- Personal Protective Equipment
- New Construction Subsurface Assessment
- Eye Protection Requirements
- Hand Protection Requirements
- Job-Specific Operating Procedures
- Deep Wells
- Hazardous Materials/Emergency Response
- Emergency Operations Ctr/SAFER Program
- Hazard Reporting/Correction Procedures
- Nuclear Requirements
- Hazard Communication
- Air Sampling Strategies
- Handling Flammables/Grounding
- Industrial Hygiene/Exposure Monitoring
- Management of Change
- Process Change Authorizations
- Process Safety Management
- Risk Management Plan
- Site Emergency Response Plan
- Asbestos Management
- Department Housekeeping Standards
- Facility Decommissioning
- Proper Disposition of Used Equipment
- Environmental Requirements Under Existing Permits
- Identify Environmental Controls
- Waste Classification
- Spill Prevention, Control and Countermeasures
- Hazardous Waste Generation, Treatment, Storage and Disposal
- Hazardous Materials Transportation Safety Awareness Training
- DOT Packaging, Labeling, Shipping Requirements
- Location of Possible Hazards
- Emergency Equipment Location and Operation
- Plant Layout/Evacuation Plan/Route(s)
- Power and Waste Stream Cut-Offs
- Communications Equipment/Emergency Phone Numbers of Required Contacts
- Secondary Containment
- Tank Management
- Container Management
- Injury/Spill/Release/Incident Reporting
- Pollution Prevention/Waste Minimization
- Guidance on HW Tank Repair/Replacement
- Inspection Plan
- Waste Analysis Plan
- Closure Plan
- Post Closure Plan
- Groundwater Protection and Monitoring
- Groundwater Sampling and Analysis Plan
- Equipment Decontamination Procedure
- Generator Requirements
- Waste Disposal Procedures
- Notification of New Raw Materials and Chemicals
- Satellite Accumulation Instructions

Appendix T

LAC 33:V.517.M.
LAC 33:V.3509.A.

Closure Plan

CYTEC Fortier Plant Waggaman, La.	Dept: Environmental	Number: ES-01
	Date: May 28, 1998	Issue No. 1
	Title: Hazardous Waste Closure Plan	Supersedes: NEW Page: 1 of 9

Prepared by:	Reviewed by:	Approved by:
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Update Responsibility: Environmental Engineer
Implementation Responsibility: Environmental Engineer

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Reference Documents: LAC 33:V.3511

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TABLE OF CONTENTS

1. INTRODUCTION

1.1 PURPOSE

The purpose of this document is to provide a written plan which describes the requirements which must be met and the activities which must be performed for the partial and/or final closure of the hazardous waste management units at Cytec Fortier. The intent of this plan is to ensure protection of the public, employees, and ecology against leakage of hazardous wastes to the environment from closed facilities which formerly stored, treated, and/or disposed of such wastes and to ensure compliance with applicable environmental regulations.

1.2 SCOPE

This standard is applicable to units which handle hazardous waste at the Cytec Fortier facility. A list of the existing Fortier hazardous waste management units is included in Attachment I. This plan must be modified in accordance with the requirements of Section 2 to include appropriate requirements for any new hazardous waste management units which are installed and to reflect other changes identified in Section 2.

1.3 DEFINITIONS

Closure - decommissioning of hazardous waste management units

DEQ - Louisiana Department of Environmental Quality

2. NOTIFICATION REQUIREMENTS

The Louisiana DEQ and other indicated agencies must be notified in the following cases:

2.1 AMENDMENT OF CLOSURE PLAN

2.1.1 Cytec must submit a written notification of or request for a hazardous waste permit modification to DEQ to authorize a change in this closure plan whenever:

a. changes in operating plans or facility design affect the closure plan; or
b. there is a change in the expected year of closure; or
c. in conducting partial or final closure activities, unexpected events require a modification of the approved closure plan.

2.1.2 Cytec must submit to DEQ a written request for a hazardous waste permit modification including a copy of the amended closure plan for approval at least 60 days prior to the proposed change in facility design or operation, or no later than 60 days after an unexpected event has occurred which has affected the closure plan. If an unexpected

event occurs during the partial or final closure period, Cytec must request a permit modification no later than 30 days after the unexpected event.

2.1.3 All written notifications or requests for a permit modification to authorize a change in the approved closure plan must be made in accordance with the applicable procedures in LAC 33:V.Chapters 3 and 7. The written notifications or requests must include a copy of the amended closure plan for review or approval by DEQ.

2.2 NOTIFICATION OF INTENTION TO CLOSE THE FACILITY

At least 180 days prior to closure of the Fortier facility Cytec must notify DEQ of Cytec's intention to close and must supply the following information:

1. date of planned closure;
2. requested changes, if any, in this closure plan, which take advantage of new technology, unforeseen situations, and other requests which improve the safety of the closed facility;
3. a proposed closure schedule, and estimated costs of each phase of the closure plan.

2.3 NOTIFICATION OF PARTIAL CLOSURE

Cytec must notify DEQ in writing at least 45 days prior to the date on which they expect to begin final closure of a hazardous waste treatment storage tank or container storage unit. The date when Cytec "expects to begin closure" must be no later than 30 days after the date on which any hazardous waste management unit receives the known final volume of hazardous wastes or, if there is a reasonable possibility that the hazardous waste management unit will receive additional hazardous wastes, no later than one year after the date on which the unit received the most recent volume of hazardous wastes. If Cytec can demonstrate to DEQ that the hazardous waste management unit or facility has the capacity to receive additional hazardous wastes and that they have taken, and will continue to take, all steps to prevent threats to human health and the environment, including compliance with all applicable permit requirements, Cytec may submit a request that DEQ approve an extension to this one-year limit.

2.4 CERTIFICATION OF CLOSURE

Within 60 days of completion of final closure of the facility, Cytec must submit to DEQ, by registered mail, a certification that the hazardous waste facility, as applicable, has been closed in accordance with the specifications in this closure plan. The certification must be signed by Cytec and by an independent registered professional engineer.

2.5 TRANSFER OF OWNERSHIP

Any proposed transfer of ownership of the property must be reported to DEQ at least 60 days prior to execution of such sale. DEQ must approve any new owner. Criteria for approval includes agreement to land use restrictions necessary to protect public health and financial

responsibility covering liability due to change in land use.

3. GENERAL REQUIREMENTS FOR CLOSURE PERFORMANCE

3.1 PROTECTION OF ENVIRONMENT

3.1.1 All partial or final closure activities must be conducted in a manner that minimizes the need for further maintenance and controls, minimizes, or eliminates, to the extent necessary to prevent threats to human health and the environment, post-closure escape of hazardous waste, hazardous waste constituents, leachate, contaminated rainfall, or waste decomposition products to the groundwater, surface waters, or to the atmosphere.

3.1.2 During partial and/or final closure, Cytec will continue to perform groundwater monitoring in compliance with applicable requirements. In addition, Cytec will take reasonable action to control run-on and run-off during partial and/or final closure activities to minimize any adverse environmental impact.

3.2 USE OF RESOURCES

3.2.1 Closure activities are to be performed using as many on-site resources as possible in order to achieve a closure that is safe, cost effective and protective of the environment. Fortier personnel are already familiar with hazardous material operations, necessary precautions, safety procedures, hazards of the materials involved, and methods of waste handling and have generally been exposed to hazardous tank cleanout procedures in the past. Fortier also has its own laboratory and various pieces of mechanical equipment necessary for closure that are to be utilized to the maximum extent practical. It is anticipated that aqueous liquids will be pumped out of the hazardous waste facilities and be disposed of in one or more of Fortier's permitted Class I disposal wells.

3.2.2 Outside commercial hazardous waste handling, treatment, transportation, and disposal organizations may be used to provide closure services as necessary. Any wastes not amenable to deepwell disposal, such as sludges and solids, are to be manifested to approved, permitted offsite disposal facilities in accordance with all applicable hazardous waste regulations.

3.2.3 For final closure, an independent professional engineer must be retained to supervise the implementation of the closure plan, observe closure activities, confirm and certify that each closure step has been successfully completed, review closure documentation,

prepare a final report, and certify acceptable closure completion, as required by applicable regulations.

4. SPECIFIC REQUIREMENTS FOR PARTIAL AND FINAL CLOSURES

4.1 TANK SYSTEMS

The following additional requirements and procedures are applicable to the closure of all of the tank systems or components of the systems listed in Attachment I. Metallic tank system components (i.e., tanks, filter bodies, piping, valves, and other ancillary equipment items) which will be disposed of by transfer to an offsite scrap metal recycling facility for material reclamation by remelting may be decontaminated and disposed of in accordance with the requirements of Section 4.1.1. All metallic or non-metallic tank system components which will be disposed of by any means other than scrap metal remelting must meet the meet the requirements of Section 4.1.2.

4.1.1 Metallic Components Disposed of as Scrap

The following requirements may only be used for metallic tank system components which will be disposed of by transfer to an offsite scrap metal recycling facility for material reclamation by remelting.

4.1.1.1 The liquid remaining in the tank system components will be pumped out and disposed of onsite in the Fortier Plant Class 1 injection wells. Any solids or sludges remaining in the tanks or filters or generated during decontamination will be removed to offsite disposal at an authorized hazardous waste incinerator and/or landfill. All wastes shipped offsite must be disposed of in accordance with all applicable regulations.

4.1.1.2 To the maximum extent possible, decontamination activities are to be confined to within existing hazardous tank secondary containment areas.

4.1.1.3 Qualified personnel will decontaminate the tank system components which are to be closed using steam or water flushing and/or high pressure water spraying (hydroblasting). All personnel will wear protective clothing and any necessary personnel protective equipment and will follow appropriate safety procedures such as necessary protective equipment, emergency methods, and tank entering procedures outlined in Fortier's Safety Procedure Manual, incorporated herein by reference. Contaminated wash water shall be collected and disposed of onsite by deep well injection or at an approved off-site location for wash water generated after shutdown of the disposal wells during final closure.

4.1.1.4 Decontamination will be considered complete when all metal surfaces when viewed with the naked eye are clean of all visible traces of waste and waste residue. Decontamination must continue using an appropriate cleaning method until all visible evidence of waste and residue are removed from all metal surfaces.

4.1.1.5 Tanks and large filter vessels shall be cut up or physically deformed prior to transfer to the scrap metal recycler to prevent their reuse.

4.1.2 Tank System Components Other Than Scrap Metal

All tank system components except those disposed of as scrap metal in accordance with the requirements of Section 4.1.1 shall meet the following requirements:

4.1.2.1 The liquid remaining in the tank system components will be pumped out and disposed of onsite in the Fortier Plant Class 1 injection wells. Any solids or sludges remaining in the tanks or filters or generated during decontamination will be removed to offsite disposal at an authorized hazardous waste incinerator and/or landfill. All wastes shipped offsite must be disposed of in accordance with all applicable regulations.

4.1.2.2 To the maximum extent possible, decontamination activities are to be confined to within existing hazardous tank secondary containment areas.

4.1.2.3 Qualified personnel will decontaminate the tank system components which are to be closed using steam or water flushing and/or high pressure water spraying (hydroblasting). When decontamination by steam or water spray is not possible or practical, physical removal of contaminated materials and disposal of the removed material offsite at an authorized hazardous waste incinerator and/or landfill shall be employed (e.g., removal and disposal of contaminated pipe insulation or removal and disposal of contaminated surface layers of concrete containment structures). All personnel will wear protective clothing and any necessary personnel protective equipment and will follow appropriate safety procedures such as necessary protective equipment, emergency methods, and tank entering procedures outlined in Fortier's Safety Procedure Manual, incorporated herein by reference. Contaminated wash water shall be collected and disposed of onsite by deep well injection or at an approved offsite location for wash water generated after shut down of the disposal wells during final closure.

4.1.2.4 When closure includes the closure of a hazardous waste secondary containment

structure, the cleanliness of the containment structure shall be demonstrated by sampling and analysis for the presence of the parameters listed in Attachment II. For each containment structure of 2500 square feet or less in plan area a minimum of two concrete samples shall be analyzed. For each containment structure of 2500 square feet or more in plan area a minimum of five concrete samples shall be analyzed. Concrete may be sampled using coring devices, concrete saws, or other appropriate methods. Testing will be performed in accordance with Cytec's Waste Analysis Plan, hereby incorporated by reference, to verify the decontamination criteria outlined in this Closure Plan. If all samples show contamination levels to be below the levels indicated in Attachment II the containment area shall be considered to have met clean closure criteria. If clean closure criteria are not met Cytec will either dispose of the concrete in compliance with applicable regulations, or petition for an amendment to the closure plan to incorporate health based and groundwater protection cleanup levels for specific constituents.

4.1.2.5 Decontamination shall continue until all visible traces or evidence of waste and waste residue have been removed. Tank system component decontamination will be considered complete and clean closure requirements met when analysis of concrete and/or wash water samples shows residual contamination levels to be below the levels indicated in Attachment II.

4.2 HAZARDOUS WASTE CONTAINER STORAGE BUILDING

All hazardous waste stored in containers (drums, rolloff bins, fiber packs, or other containers) will be properly manifested and removed to offsite disposal at an authorized facility. Qualified personnel will then decontaminate the concrete pads and containment areas in the container building with steam or high pressure water spraying, and the wash water shall be disposed of via the facility's deepwells. The concrete will be sampled consistent with the procedures outlined in 4.1.2.4. If contaminated areas can not be effectively cleaned with water or steam spray, contaminated areas are to be physically removed by grinding, chipping, or other appropriate means, and properly disposed of at an authorized offsite facility. All personnel will wear protective clothing and any necessary personal protective equipment and will follow appropriate safety procedures as outlined in Fortier's Safety Procedure Manual, incorporated herein by reference.

4.3 INJECTION WELLS (NO. 1 THROUGH 5)

After all plant operations terminate so that all remaining liquid wastes have been disposed of, the Fortier Plant's five deepwells will be plugged and abandoned in accordance with Louisiana Department of Natural Resources (DNR), Office of Conservation, Underground Injection

Control Guidelines. The aboveground piping to the well heads (i.e., the RCRA portion of the injection well system) will be dismantled and decontaminated with steam and/or wash water in accordance with the requirements of section 4.1.

5. MAXIMUM HAZARDOUS WASTE INVENTORY

Attachment I shows the maximum inventory of wastes which may exist in storage at any time during the operating life of the Fortier Plant. These amounts are based on full capacity of equipment capable of containing the hazardous wastes, although the facilities have not reached and may never reach full capacity. Closure is assumed in this plan to take place at maximum inventory.

6. SCHEDULE

The proposed schedule for closure activities is shown in Attachment III.

7. CLOSURE COST ESTIMATES

To develop an estimate for regulatory financial responsibility purposes, Cytec has used unit costs and quantities to develop an estimate of closure costs. This estimate is based on best engineering judgement and current cost data. However, this should not be construed as an admission by Cytec that the estimated amount must be exactly expended in order to close the facility in an acceptable manner. On the contrary, Cytec will, at closure, use the most cost-effective, environmentally sound methods for closure, which may result in either lower or higher costs than those set forth in these estimates.

7.1 Closure Cost Estimate

Closure costs have been developed based on maximum inventories of waste management units and are presented in Attachment IV. Activities include removal and disposal of liquid and solid waste inventory, removal of contaminated concrete (if necessary), decontamination of tanks and filters and associated equipment, decontamination of container storage building, sampling and laboratory analyses, disposal of wash liquids, dismantling of deep well surface facilities, and closure certification by an independent, Louisiana licensed, professional engineer as required by applicable regulations. Closure costs have been based on the use of contracted labor and services although Fortier intends to use onsite resources to the maximum possible extent during closure. Attachment VI lists costs used as the basis for calculating the estimated closure cost amounts.

7.2 Updating of Cost Estimates

The closure and post-closure cost estimates are to be reviewed and updated annually by the environmental department to reflect the effect of inflation and other minor cost impacts. Updated cost estimates are to be kept on file with the controlled copy of this closure plan and are to be submitted to DEQ as required by regulations, but do not require updating or reissuing of this plan. Events or items with a major impact on estimated costs (e.g., installation of additional waste management units) require updating of the plan and cost estimates in accordance with the requirements of section 2.

ATTACHMENT I

FORTIER HAZARDOUS WASTE MANAGEMENT UNITS
AND
MAXIMUM WASTE QUANTITIES

FORTIER HAZARDOUS WASTE MANAGEMENT UNITS
AND
MAXIMUM WASTE QUANTITIES

28-May-98

Unit No.	Waste Management Unit Name	Capacity (gallons)	
100-5 A, B, C	RCB Filters A, B, C	7,500	
100-6	RCB / MET Backwash Tank	19,000	
101-52	MMA Lab Collection Tank	40	
CF-401 A, B, C, D	WW Cartridge Filters A, B, C, D	8	
F-401 A, B, C, D	WW Filters A, B, C, D	17,800	
HRD-V50 A, B, C, D	MET Filters A, B, C, D	8,400	
MET-1	Miscellaneous Effluent Tank 1	1,000,000	
MET-2	Miscellaneous Effluent Tank 2	2,000,000	
MF-307	Secondary Filter Feed Tank	95,000	
T-500	MET Injection Tank	60,000	
TA-402	WWCB Well Injection Tank	10,000	
TA-403	Catalyst Settling Tank	60,000	
TA-404	Primary Filter Feed Tank	60,000	
TA-501 A	WWCB Backwash Tank - North	150,000	
TA-501 B	WWCB Backwash Tank - South	150,000	
	Container Storage Building		
	Containers (drums, fiber pacs, etc.)	23,760	
	Rolloff bins	120	cubic yards
	Former Tank 24D Containment Area (tank has been clean closed and removed, a portion of the tank containment structure remains and requires closure)	0	

ATTACHMENT II

CLOSURE ANALYSIS PARAMETERS

CLOSURE ANALYSIS PARAMETERS

Washwater and concrete samples are to be analyzed using the EPA SW 846 analytical methods shown for the detection of the indicator parameters listed. The specific indicator parameters listed were selected because they are hazardous constituents most likely to be present as a result of facility operations.

Cytec's laboratory has extensive experience with the analysis of these parameters and has found that the analytical methods listed below yield the most sensitive and accurate results achievable. However, given their non-routine nature and the fact that the potential for matrix interferences exists, the method detection limits and practical quantitation limits may not always be achievable. In all cases, the laboratory will be instructed to achieve the lowest possible detection limit. Clean closure will be achieved if the indicator parameters are all reported at less than three times the method detection limit (MDL) Three times the detection limit is used to account for interference and reflects a practical quantitation limit (PQL). EPA SW 846 refers to the PQL as the Estimated Quantitation Limit and defines it as the lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions.

Parameter	Clean Closure Levels (mg/kg or mg/L)	Analytical Method
Acetone	3 x MDL	8260B
Acrylamide	3 x MDL	8310 (1)/8316
Acrylic Acid	3 x MDL	HPLC-UVD
Acrylonitrile	3 x MDL	8260B
Dimethylamine	3 x MDL	HPLC-Conductimetric Detector
Methanol	3 x MDL	8000(Direct Injection)
Methyl Methacrylate	3 x MDL	8260B
Acrolein	3 x MDL	8260B
Acetonitrile	3 x MDL	8260B
1,1,1-Trichloroethane	3 x MDL	8260B
Corrosivity	pH @ 2 to 12.5 S.U.	9060B and 9045C
Reactivity	Total Cyanide < 10ppm	9010B(2)

HPCL - High Pressure Liquid Chromatography
UVD - Ultra Violet Detector
ppm - Part per million
S.U. - Standard Units
PQL - Practical Quantitation Limit
MDL - Method Detection Limit (Numeric values have been intentionally omitted, because these values change in response to the sample matrix and technological advances.)

(1) 8310 modified for mobile phase and detection wavelength (Acrylamide analysis).
(2) The 10 ppm total cyanide cutoff level is derived from OSHA's standard of 4.7 ppm human exposure limit for reactive cyanide (HCN) (see 29 CFR, Chapter XVII, Part 1910, Subpart Z). It should be noted that reactive cyanides represent only a portion of the total cyanides in Fortier's hazardous waste system thereby providing an additional margin of safety.

ATTACHMENT III

CLOSURE SCHEDULE

ANTICIPATED CLOSURE SCHEDULE

ACTIVITY	DAYS 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180
1. Receive Final Waste (plant operations terminate)	X
2. Dispose of Final Waste (Includes waste in equipment and Container Storage Building)	XXXXXXXXXXXXXXXXXXXXXXXX
3. Tanks and Filters (Catalyst Settling Tank, Primary and Secondary Filter Feed Tanks, WWCB Injection Tank, NSB Backwash Tank, MET Injection Tank, Waste Acid Backwash Tank, MET Tanks No. 1 and 2, WWCB North and South Tanks Sand Filters, Cartridge Filters and Container Storage Building)	
a. Pump out liquids (Tanks/Filters only)	XXXXXXXXX
b. Remove sludges (Tanks/Filters only)	XXXXXXXXXXXXXX
c Decontaminate and dispose of wash (Tanks/Filters/Container Storage Bldg..)	XXXXXXXXXXXXXXXXXXXX
d Dismantle if necessary (Tanks/Filters/Container Storage Building)	XXXXXXXXXXXX
4. Wells (Nos. 1 through 5)	
a. Receive liquids from tanks and filters	XXXXXXXXXXXXXXXXXXXXXX
b. Plug	XXXXXXXXXXXX
c. Dismantle	XXXXXXXXXXX
d. Decontaminate or dispose	XXXXXXXXXX
5. Completion of Closure and Certification	X

ATTACHMENT IV

CLOSURE COST ESTIMATE

CLOSURE COST ESTIMATE

16-Feb-98

CLOSURE COST ESTIMATE	Quantity	Units	Cost (1998$)
Catalyst Settling Tank TA-403			
Pump and dispose of liquid	54337	gallons	$ 1,049
Remove and dispose of solids	70826	pounds (dry wt.)	$ 54,170
Decontaminate tank and associated items	21	hours	$ 522
Analyze rinsate	1	sample	$ 750
Dispose of washwater and press liquid	18198	gallons	$ 351
P.E. Certification of closure	1	certification	$ 3,200
Primary Filter Feed Tank TA-404			
Pump and dispose of liquid	54337	gallons	$ 1,049
Remove and dispose of solids	70826	pounds (dry wt.)	$ 54,170
Decontaminate tank and associated items	21	hours	$ 522
Analyze rinsate	1	sample	$ 750
Dispose of washwater and press liquid	18198	gallons	$ 351
P.E. Certification of closure	1	certification	$ 3,200
Secondary Filter Feed Tank MF-307			
Pump and dispose of liquid	86033	gallons	$ 1,660
Remove and dispose of solids	112127	pounds (dry wt.)	$ 85,758
Decontaminate tank and associated items	28	hours	$ 704
Analyze rinsate	1	sample	$ 750
Dispose of washwater and press liquid	25856	gallons	$ 499
P.E. Certification of closure	1	certification	$ 3,200
WWCB Well Injection Tank TA-402			
Pump and dispose of liquid	9056	gallons	$ 175
Remove and dispose of solids	11813	pounds (dry wt.)	$ 9,035
Decontaminate tank and associated items	6	hours	$ 159
Analyze rinsate	1	sample	$ 750
Dispose of washwater and press liquid	4761	gallons	$ 92
P.E. Certification of closure	1	certification	$ 3,200
RCB/MET Backwash Tank 100-6			
Pump and dispose of liquid	18320	gallons	$ 354
Remove and dispose of solids	6260	pounds (dry wt.)	$ 4,389
Decontaminate tank and associated items	11	hours	$ 267
Analyze rinsate	1	sample	$ 750
Dispose of washwater and press liquid	7092	gallons	$ 137
P.E. Certification of closure	1	certification	$ 3,200

CLOSURE COST ESTIMATE	Quantity	Units	Cost (1998$)
MET Injection Tank T-500			
Pump and dispose of liquid	57854	gallons	$ 1,117
Remove and dispose of solids	19729	pounds (dry wt.)	$ 13,835
Decontaminate tank and associated items	21	hours	$ 528
Analyze rinsate	1	sample	$ 750
Dispose of washwater and press liquid	14813	gallons	$ 286
P.E. Certification of closure	1	certification	$ 3,200
WW Primary and Secondary Filters F-401 A, B, C, D (total for 4)			
Pump and dispose of liquid	16120	gallons	$ 311
Remove and dispose of solids	21033	pounds (dry wt.)	$ 16,087
Decontaminate tank and associated items	13	hours	$ 331
Analyze rinsate	4	sample	$ 3,000
Dispose of washwater and press liquid	9615	gallons	$ 186
P.E. Certification of closure	1	certification	$ 3,200
MET Tank No. 1			
Pump and dispose of liquid	964230	gallons	$ 18,610
Remove and dispose of solids	328172	pounds (dry wt.)	$ 230,125
Decontaminate tank and associated items	137	hours	$ 3,431
Analyze rinsate	1	sample	$ 750
Dispose of washwater and press liquid	118105	gallons	$ 2,279
P.E. Certification of closure	1	certification	$ 3,200
MET Tank No. 2			
Pump and dispose of liquid	1928460	gallons	$ 37,219
Remove and dispose of solids	656229	pounds (dry wt.)	$ 460,169
Decontaminate tank and associated items	236	hours	$ 5,897
Analyze rinsate	1	sample	$ 750
Dispose of washwater and press liquid	213066	gallons	$ 4,112
P.E. Certification of closure	1	certification	$ 3,200
WWCB Backwash Tank North TA-501 A			
Pump and dispose of liquid	135842	gallons	$ 2,622
Remove and dispose of solids	177028	pounds (dry wt.)	$ 135,396
Decontaminate tank and associated items	40	hours	$ 990
Analyze rinsate	1	sample	$ 750
Dispose of washwater and press liquid	37909	gallons	$ 732
P.E. Certification of closure	1	certification	$ 3,200
WWCB Backwash Tank South TA-501 B			
Pump and dispose of liquid	135842	gallons	$ 2,622
Remove and dispose of solids	177028	pounds (dry wt.)	$ 135,396
Decontaminate tank and associated items	40	hours	$ 990
Analyze rinsate	1	sample	$ 750
Dispose of washwater and press liquid	37909	gallons	$ 732
P.E. Certification of closure	1	certification	$ 3,200

CLOSURE COST ESTIMATE	Quantity	Units	Cost (1998$)
RCB Filters 100-5 A, B, C (total for 3)			
Pump and dispose of liquid	7232	gallons	$ 140
Remove and dispose of solids	2477	pounds (dry wt.)	$ 1,737
Decontaminate tank and associated items	6	hours	$ 158
Analyze rinsate	3	sample	$ 2,250
Dispose of washwater and press liquid	4068	gallons	$ 79
P.E. Certification of closure	1	certification	$ 3,200
MET Filters HRD-V50 A, B, C, D (total for 4)			
Pump and dispose of liquid	8100	gallons	$ 156
Remove and dispose of solids	2776	pounds (dry wt.)	$ 1,946
Decontaminate tank and associated items	8	hours	$ 188
Analyze rinsate	4	sample	$ 3,000
Dispose of washwater and press liquid	4804	gallons	$ 93
P.E. Certification of closure	1	certification	$ 3,200
WW Cartridge Filters CF-401 A, B, C, D (total for 4)			
Pump and dispose of liquid	7	gallons	$ 0
Remove and dispose of solids	10	pounds (dry wt.)	$ 7
Decontaminate tank and associated items	0.1	hours	$ 3
Analyze rinsate	1	sample	$ 750
Dispose of washwater and press liquid	74	gallons	$ 1
P.E. Certification of closure	1	certification	$ 3,200
MMA Lab Collection Tank 101-52			
Pump and dispose of liquid	36	gallons	$ 1
Remove and dispose of solids	48	pounds (dry wt.)	$ 36
Decontaminate tank and associated items	0.2	hours	$ 4
Analyze rinsate	1	sample	$ 750
Dispose of washwater and press liquid	103	gallons	$ 2
P.E. Certification of closure	1	certification	$ 3,200
AN Waste Treatment Area - North Containment			
Decontaminate containment area	114	hours	$ 2,845
Dispose of washwater	68284	gallons	$ 1,318
Remove and dispose of solids	341	pounds (dry wt.)	$ 261
Analyze rinsate	1	sample	$ 750
P.E. Certification of closure	1	certification	$ 3,200
AN Waste Treatment Area - South Containment			
Decontaminate containment area	91	hours	$ 2,277
Dispose of washwater	54644	gallons	$ 1,055
Remove and dispose of solids	273	pounds (dry wt.)	$ 209
Analyze rinsate	1	sample	$ 750
P.E. Certification of closure	1	certification	$ 3,200

CLOSURE COST ESTIMATE	Quantity	Units	Cost (1998$)
MET Tank Area Containment			
Decontaminate containment area	602	hours	$ 15,046
Dispose of washwater	361108	gallons	$ 6,969
Remove and dispose of solids	1806	pounds (dry wt.)	$ 1,381
Analyze rinsate	1	sample	$ 750
P.E. Certification of closure	1	certification	$ 3,200
ACH Lab Waste Tank Containment			
Decontaminate containment area	0.5	hours	$ 12
Vacuum truck liquid transfer	0.5	hours	$ 26
Dispose of washwater	280	gallons	$ 5
Remove and dispose of solids	1	pounds (dry wt.)	$ 1
Analyze rinsate	1	sample	$ 750
P.E. Certification of closure	1	certification	$ 3,200
Former Tank 24D Containment			
Decontaminate containment area	2	hours	$ 54
Vacuum truck liquid transfer	2	hours	$ 119
Dispose of washwater	1296	gallons	$ 25
Remove and dispose of solids	6	pounds (dry wt.)	$ 5
Analyze rinsate	1	sample	$ 750
P.E. Certification of closure	1	certification	$ 3,200
Container Storage Building			
Remove containers to offsite disposal	432	55 gal drums	$ 112,320
Remove rolloff bins to offsite disposal	4	rolloff bins	$ 30,000
Decontaminate containment area	38	hours	$ 944
Vacuum truck liquid transfer	38	hours	$ 2,076
Dispose of washwater	22647	gallons	$ 437
Remove and dispose of solids	113	pounds (dry wt.)	$ 87
Analyze rinsate	6	sample	$ 4,500
P.E. Certification of closure	1	certification	$ 3,200
Piping to Deepwell Closure (RCRA Portion)			
Deepwell No. 1	150	feet	
Deepwell No. 2	600	feet	
Deepwell No. 3	1050	feet	
Deepwell No. 4	600	feet	
Deepwell No. 5	900	feet	
Decontaminate pipe	35	hours	$ 874
Dispose of washwater	20986	gallons	$ 405
Dispose of soilds	105	pounds (dry wt.)	$ 80
Analyze rinsate	5	sample	$ 3,750
P.E. Certification of closure	1	certification	$ 3,200

CLOSURE COST ESTIMATE		Quantity	Units	Cost (1998$)
Fencing				
Impoundment No. 1		45	hours	$ 1,125
Impoundment No. 3		38	hours	$ 950
SUBTOTAL				$ 1,565,494
Administrative Costs	10%			$ 156,549
Contingencies	10%			$ 156,549
TOTAL ESTIMATED CLOSURE COST				$ 1,878,593

ATTACHMENT V

CLOSURE AND POST-CLOSURE COST BASES

CLOSURE AND POST-CLOSURE COST BASES

16-Feb-98

Cost Item		1998 $	/unit
Hydroblast		150	sq ft/hr
Hydroblast liquid generation		4	gal/sq ft
Hydroblast solids generation		0.02	lbs/sq ft
Vacuum truck liquid transfer		55	$/hour
Labor		25	$/hour
Sample Anlaysis		750	$/sample
P.E. Certification		3200	$/cert
Onsite deepwell disposal of liquids		0.0193	$/gallon
Dewater and offsite disposal of solids	(MET) (WW)	0.7012 0.7648	$/dry pound $/dry pound
Offsite drum disposal		260	/drum
Rolloff bin disposal (offsite incineration)		7500	/rolloff
Groundwater analysis		320	$/sample
Technical inspection/survey crew		56	$/hour
Topsoil		31	$/cubic yard
Seeding		0.06	$/sq. ft.
Mowing crew		72	$/hour
Fencing replacement		23	$/linear foot
Groundwater well replacement		5000	$/well

Appendix U

LAC 33:V.517.N.
LAC 33:V.2901
LAC 33:V.3517

Letter from LDEQ to ACCO (presently Cytec) Dated June 7, 1989
Letter from ACCO (presently Cytec) to LDEQ Dated April 28, 1989

State of Louisiana

Department of Environmental Quality

BUDDY ROEMER
Governor

PAUL TEMPLET
Secretary

June 7, 1989

H. T. THURBER

JUN 14 1989

JUN 14 1989

Mr. H. T. Thurber, Plant Manager
American Cyanamid Company
Fortier Plant
10800 River Road
Westwego, Louisiana 70094

RE: American Cyanamid Company
(LAD00817340-CP4) Closure Status
Acceptance of Closure Certification

Dear Mr. Thurber:

The Louisiana Department of Environmental Quality-Hazardous Waste Division (LDEQ-HWD) is in receipt of your closure certification dated April 28, 1989.

This Department has reviewed your certification and concurs that you have closed the two (2) hazardous waste surface impoundments 1 and 3 in accordance with your closure plan of July 17, 1988.

Your patience and cooperation during the processing of this information is appreciated. If you have any questions concerning this matter, please contact Y. S. Goh at (504) 342-4685.

Sincerely,

Timothy W. Hardy

TIMOTHY W. HARDY
Assistant Secretary

TWH:YSG:pgw

CYANAMID

American Cyanamid Company
Fortier Plant
10800 River Road
Westwego, LA 70094
(504) 431-9511
CERTIFIED MAIL NO. P 668 942 560
RETURN RECEIPT REQUESTED

April 28, 1989

Mr. Glenn Miller, Administrator
Dept. of Environmental Quality
Hazardous Waste Division
Post Office Box 44307
Baton Rouge, Louisiana 70804

Dear Mr. Miller:

Pursuant to LAC 33:V.4387.A., the attached "Certification for Closure of Two Hazardous Waste Surface Impoundments' is herein submitted for the American Cyanamid Company Fortier Plant in Westwego (Jefferson Parish), along with the independent Professional Engineer's supporting documentation. This certification pertains to "Impound 1" and "Impound 3" closed in accordance with the permit issued by your department on October 27, 1988. As described in the certification, both of these surface impoundments were closed in-place as landfills. Post-closure will now occur in accordance with the post-closure plan submitted on July 17, 1988. Additionally, in order to comply with LAC 33:V.4387.B., a copy of the survey plat and transmittal letter submitted to the local zoning authority is also provided.

In addition to this certification submitted pertaining to Permit Number LAD008175390-CP4, Fortier has submitted the following closure certifications relative to these closure permits:

Permit Number	Facilities	Submittal
LAD008175340-CP1	Three Pits	5/27/88 and 9/19/88
LAD008175340-CP2	One Tank, One Filter System	12/27/88
LAD008175340-CP3	Two Tanks	8/1/88

Pursuant to LAC 33:V.4403.H., we request that you release our plant from the requirements of that section for all of the above closed units.

We appreciate your assistance in the facilitation of closure implementation and completion in order to comply with the provisions of HSWA. If you have any questions or comments, please let us know.

Sincerely yours,

H. T. Thurber, Plant Manager

Cytec Industries, Inc.
EPA I.D. No. LAD 008175390
HTT:ARJ:ww

Westwego, LA: Jefferson
Chemical Manufacturing Facility
NOD Response

cc: Mr. Jeff Meyers, DEQ

1.0 CERTIFICATIONS

1.1 OWNER CLOSURE CERTIFICATION

The undersigned, H. T. Thurber, Plant Manager for the Fortier Plant of American Cyanamid Company, a corporation incorporated under the laws in the State of Maine and licensed to do business in Louisiana, which formerly owned and operated two hazardous waste surface impoundments known as Impound 1 and Impound 3 located at the Fortier Plant in Jefferson Parish, Louisiana, hereby verifies that the Fortier Plant has completed and permanently ceased the active operation of the facilities and has fully implemented all measures relating to the closure of the facilities as set forth in the Closure Plan approved by the Louisiana Department of Environmental Quality for said facilities.

NOW, THEREFORE, I, H. T. Thurber, hereby swear and affirm that the above-named hazardous waste facilities have been closed in accordance with the facility's Closure Plan approved in writing by the Office of Solid and Hazardous Waste on October 27, 1988 and that all measures relating to the closure of the facility required by the Closure Plan and the rules and regulations of the Louisiana Hazardous Waste Regulations have been fully implemented.

H. T. Thurber
Plant Manager

5/1/89
Date

10800 River Road
Westwego, Louisiana 70094

I.2 INDEPENDENT REGISTERED PROFESSIONAL ENGINEER CERTIFICATION

I, Raymond F. Vachon, a Professional Engineer registered pursuant to the Professional Engineers Registration Law hereby certify that I have reviewed the Closure Plan for Impound 1 and Impound 3 located at American Cyanamid Company's Fortier Plant in Westwego and that I am familiar with the rules and regulations of Louisiana Hazardous Waste Regulations pertaining to closure of such facilities, and that the closure of the aforementioned facilities have been performed in a timely fashion and in full and complete accordance with the facility Closure Plan approved in writing by the Office of Solid and Hazardous Waste on October 27, 1988 and the rules and regulations of the Louisiana Hazardous Waste Regulations. "Certify" as used herein is understood to be an expression of professional opinion.

Raymond F. Vachon, P.E.
License Number 36965
State of Texas

April 12, 1989
Date

Walk, Haydel & Associates, Inc.
600 Carondelet Street
New Orleans, Louisiana 70130-3587
(504) 586-8111

Appendix V

LAC 33:V.517.N.

Letter from ACCO (presently Cytec) to Jefferson Parish Dated June 14, 1989 (2)
Letter from ACCO (presently Cytec) to LDEQ Dated June 14, 1989

CYANAMID

American Cyanamid Company
Fortier Plant
10800 River Road
Westwego, LA 70094
(504) 431-9511

CERTIFIED MAIL NO. P 668 942 581
RETURN RECEIPT REQUESTED

June 14, 1989

Jefferson Parish
Department of Zoning
1221 Elmwood Park Blvd.
Jefferson, LA 70123

Dear Sir or Madam:

Attached please find a record of the type, location and quantity of hazardous wastes disposed of on a section of property located at 10800 River Road, Westwego (mailing address), owned by American Cyanamid Company. This information was previously submitted to the Louisiana Department of Environmental Quality (DEQ) in an attachment to the Hazardous Waste Annual Report submitted on April 28, 1989. It supplements the survey plat submitted to your office on May 1, 1989, which specifically identifies the coordinates of closed Lagoons I and III (i.e., Impoundments No.1 and No.3). As with the survey plat, this information is also being submitted to your office to comply with state and federal laws pertaining to hazardous waste management.

Specifically, Title 33 of the Louisiana Administrative Code, Part V, Subpart 1, Chapter 43, Section 4393.A, states the following:

> "A. No later than 60 days after certification of closure of each hazardous waste disposal unit, the owner or operator must submit to the local zoning authority, or the authority with jurisdiction over local land use, and to the administrative authority, a record of the type, location, and quantity of hazardous wastes disposed of within each cell or other disposal unit of the facility. For hazardous wastes disposed of before January 12, 1981, the owner or operator must identify the type, location and quantity of the hazardous wastes to the best of his knowledge and in accordance with the records he has kept."

Closure of Impoundments No.1 and No.3 was complete in March, and certifications, along with supporting documentation describing closure activities, were submitted to DEQ on May 1, 1989. A copy of such is also available at our facility, and will remain on site for the life of the plant.

If you have any questions or comments on this submittal, please contact Ms. Anita Junker at 431-6479.

Sincerely,

AMERICAN CYANAMID COMPANY
Chemical Products Division

H. T. Thurber

H. T. Thurber, Plant Manager

encl

c: Mr. Glenn Miller, DEQ, Certified Mail No. P 668 942 582
Mr. Jeff Meyers, DEQ

CLOSURE DISPOSAL QUANTITIES

American Cyanamid Co.
Fortier Plant

The American Cyanamid Fortier Plant in Westwego, Louisiana, closed all land treatment, storage, and disposal units existing onsite during 1988. Such units consisted entirely of surface impoundments. Three existing hazardous impoundments and one existing nonhazardous impoundment were clean closed by decontamination, with contaminated materials primarily hauled to two large onsite hazardous disposal impoundments, stabilized, and capped. The following provides a best estimate of material generated and added during closure activities (and disposed of onsite during such closures) for documentation to be provided consistent with annual reporting and operating record requirements. (One compacted cubic yard is assumed to equal one ton for the purposes of quantifying disposal tonnage.)

Material Description	Waste Code	Estimated Quantity
Lagoon I and III Sludges After Dewatering	Mixture of F001, K011, K013, P063, P069, U002, U007, U008, U009, U092, U154, U162, D002, D003	30,232 Tons
North WWCB Pit Soils	K011	2,300 Tons
South WWCB Pit Soils	K011	2,600 Tons
Deepwell Pit Soil	Mixture of F001, K011, K013, P063, P069, U002, U007, U008, U009, U092, U154, U162, D002, D003	2,900 Tons
Deepwell Pit Sludges	Mixture of F001, K011, K013, P063, P069, U002, U007, U008, U009, U092, U154, U162, D002, D003	4,500 Tons
Lagoon II Soil	Nonhazardous until mixed with contents of others	5,700 Tons
Lagoon II Sludges	Nonhazardous until mixed with contents of others	11,000 Tons
Solidification Agents (kiln dust/lime/fly ash)	Nonhazardous until mixed with contents of others	6,800 Tons
Polymer	Nonhazardous until mixed with contents of others	42 Tons
Total in Lagoons I and III	Mixture of F001, K011, K013, P063, P069, U002, U007, U008, U009, U092, U154, U162, D002, D003	66,074 Tons

Based on the following calculated volumes: Lagoon I - 47,126 $yd.^3$; Lagoon III - 18,948 $yd.^3$

ARJ04254)

CYANAMID

American Cyanamid Company
Fortier Plant
10800 River Road
Westwego, LA 70094
(504) 431-9511

CERTIFIED MAIL NO. P 668 942 583
RETURN RECEIPT REQUESTED

June 14, 1989

Jefferson Parish Clerk of Court
Civil Filing/Civil Records
1221 Elmwood Park Blvd.
Jefferson, LA 70123

Dear Clerk of Court:

Re: Conveyance Record Filing

Per our discussion with your office, please file the attached notarized affidavit in the Conveyance Record for Jefferson Parish. A check in the amount of $9.50 is also included. As discussed, this information is being submitted to your office to comply with state and federal laws pertaining to hazardous waste management.

Specifically, Title 33 of the Louisiana Administrative Code, Part V, Subpart 1, Chapter 43, Section 4393.B., states the following:

> "B. Within 60 days of certification of closure of the first hazardous waste disposal unit and within 60 days of certification of closure of the last hazardous waste disposal unit, the owner or operator must:
>
> 1. Record, in accordance with state law, a notation on the deed to the property--or on some other instrument which is normally examined during title search--that will perpetuity notify any potential purchaser of the property that:
>
> a. The land has been used to manage hazardous waste; and
>
> b. Its use is restricted under Subchapter F regulations; and
>
> c. The survey plat and record of the type, location, and quantity of hazardous wastes disposed of within each cell or other hazardous waste disposal unit of the facility required by LAC 33:V.4387 and LAC 33:V.4393.A. have been filed with the local zoning authority or the authority with jurisdiction over local land use and with the administrative authority;"

Closure of Impoundments No.1 and No.3 was complete in March, and certifications, along with supporting documentation describing closure activities, were submitted to the Louisiana Department of Environmental Quality (DEQ) on May 1, 1989. Also submitted on May 1 was a survey plat to the Jefferson Parish Zoning Department and DEQ denoting locations where wastes remain. A record of waste types and estimated quantities has previously been submitted to DEQ and is also being submitted to the Zoning Department at the time of this submission. Copies of such submittals are available at our facility, and will remain on site for the life of the plant.

If you have any questions or comments on this submittal, please contact Ms. Anita Junker at 431-6479.

Sincerely,

AMERICAN CYANAMID COMPANY
Chemical Products Division

H. T. Thurber, Plant Manager

encl

CYANAMID

American Cyanamid Company
Fortier Plant
10800 River Road
Westwego, LA 70094
(504) 431-9511

AFFIDAVIT
POST-CLOSURE NOTICE FILED IN CONVEYANCE RECORD
OF THE JEFFERSON PARISH CLERK OF COURT

To Whom It May Concern:

I, T. E. Call, the undersigned, Acting Plant Manager of the American Cyanamid Company Fortier Plant, 10800 River Road, City of Westwego, Parish of Jefferson, State of Louisiana, hereby give the following notice as required by LAC 33:V.4393.B.

1. I am an authorized representative of the American Cyanamid Company, which has since 1952 been in possession of the following described lands: a portion of ground composed of several tracts of land existing on LA Highway 18 at the Jefferson/St. Charles Parish line, R22E:T13S:SEC3.

2. Since that time, ACCO has disposed of hazardous chemical wastes under the terms of regulations promulgated by the United States Environmental Protection Agency (EPA) and the Louisiana Department of Environmental Quality (DEQ) on/in the above-described land.

3. The future use of the above-described land is restricted under the terms of LAC 33:V; the post-closure use of the property must never be allowed to disturb the integrity of either the containment system or the facility's monitoring system, unless the EPA or DEQ determines that the proposed use (1) will not increase the potential threat to human health or the environment, or (2) is necessary to reduce the threat to human health or the environment.

4. Any and all future purchasers of this land should inform themselves of the requirements of the regulations and ascertain the amount and nature of wastes disposed of on/in the above-described property.

5. A survey plat has been filed with the Jefferson Parish Zoning Department, 1221 Elmwood Park Blvd., Jefferson, LA 70123, and with the DEQ, Hazardous Waste Division, P. O. Box 44307, Baton Rouge, LA 70804 showing the location and dimensions and a record of the type, location and quantity of waste disposal within each unit of the facility where wastes remain that were closed in 1988 to 1989 (i.e., Impoundments No. 1 and No. 3).

T. E. Call, Acting Plant Manager — Date

Notary Public — Date

AMERICAN CYANAM[redacted]OMPANY
AVONDALE, LA. [redacted]4

CHECK No 311103[redacted]

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THIS CHECK IS IN FULL PAYMENT OF THE ITEMS LISTED BELOW

OUR NO	INV DATE	INV NO	GROSS AMT.	CASH DISC'T	NET AMT
	6/12/89				$9.50
	Filing Fee; Conveyance Record				

PAY $9 50

6/15/89
DATE

VOID AFTER 90 DAYS

TO THE ORDER OF

Jefferson Parish Clerk of Court

AUTHORIZED SIGNATURE

AUTHORIZED SIGNATURE NOT VALID UNLESS COUNTER SIGNED IF DRAWN FOR MORE THAN $2,500.00

MORGAN CHRISTIANA CORPORATION
MORGAN CHRISTIANA CENTER
500 CHRISTIANA STANTON ROAD
STANTON, DELAWARE 19718

⑈311103⑈ ⑆031100238⑆ 230 23 647⑈

CYANAMID

American Cyanamid Company
Fortier Plant
10800 River Road
Westwego, LA 70094
(504) 431-9511

CERTIFIED MAIL NO. P 668 942 584
RETURN RECEIPT REQUESTED

June 14, 1989

Mr. Glenn Miller, Administrator
Department of Environmental Quality
Hazardous Waste Division
Post Office Box 44307
Baton Rouge, LA 70804

Dear Mr. Miller:

Attached please find a signed certification stating that a document has been filed with the Jefferson Parish Clerk of Court recording the onsite management of hazardous waste, its restricted use, and information on file with the Zoning Department in accordance with LAC 33:V.4393.B.1. This certification and a copy of the document as filed is being submitted to comply with LAC 33:V.4393.B.2.

Closure of Impoundments No.1 and No.3 was complete in March, and certifications, along with supporting documentation describing closure activities, were submitted to your office on May 1, 1989. Also submitted on May 1 was a copy of the survey plat submission to the Jefferson Parish Zoning Department denoting locations where wastes remain. A record of waste types and estimated quantities has previously been submitted to your office as an attachment to the Annual Report information dated April 28, 1989 and is also being submitted to the Zoning Department (copy to your office) at the time of this submission. Copies of such submittals are available at our facility, and will remain on site for the life of the plant. If you have any questions or comments on this or the previous submittals, please contact Ms. Anita Junker at 431-6479.

Per LAC 33:V.509 and LAC 33:V.513, I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

This submission and any past or future communications or discussions regarding this matter are not intended to admit any fact of liability, or to waive or affect any rights.

Sincerely,

AMERICAN CYANAMID COMPANY
Chemical Products Division

H. T. Thurber, Plant Manager

encl

CYANAMID

American Cyanamid Company
Fortier Plant
10800 River Road
Westwego, LA 70094
(504) 431-9511

CERTIFICATION OF
POST-CLOSURE PARISH FILE DOCUMENTATION

I, T. E. Call, Acting Plant Manager of the American Cyanamid Company, Fortier Plant, 10800 River Road, Westwego, Jefferson Parish, Louisiana 70094, certify that a document examined during a title search of the facility has been filed denoting the existence of closed hazardous waste disposal units as required by LAC 33:V.4393.B or LAC 33:V.3525.B, at the Jefferson Parish Clerk of Court located at 1221 Elmwood Park Blvd., Jefferson, Louisiana 70123. A copy of the document as filed is attached to this certification.

T. E. Call

T. E. Call, Acting Plant Manager

6/30/89

Date

Appendix W

LAC 33:V.517.0.
LAC 33:V.3701

Financial Assurance

CYTEC

CYTEC INDUSTRIES INC.
Five Garret Mountain Plaza
West Paterson, NJ 07424
(973) 357-3100

March 31, 1998

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Louisiana Department of
Environmental Quality
Hazardous Waste Permit Section
P. O. Box 82178
Baton Rouge, LA 70884-2178

Attention: Mr. James H. Brent, Ph.D. - Administrator

Reference: **Cytec Industries Inc.**
Fortier Plant
10800 River Road
Westwego, LA
EPA RCRA ID No. LAD 008175390

Dear Mr. Brent:

Attached herewith are the following documents submitted by Cytec Industries Inc. to comply with financial assurance requirements in accordance with Chapter 37 of the Louisiana Hazardous Waste Regulations:

1. Certification of financial assurance submittal by Mr. J. Gill, Plant Manager.

2. A summary table of Cytec's closure, post-closure, UIC plug/abandon and underground storage tank financial assurance is included as Tables to the Chief Financial Officer's letter.

3. Letter from the Chief Financial Officer meeting the financial test for sudden and non-sudden liability and for closure and post closure costs for the referenced facility.

4. Copy of Cytec's 1997 Annual Report which contains an independent CPA's report on examination of our financial statements for the fiscal year ended December 31, 1997.

5. Independent CPA's confirmation of data on tangible net worth and total assets in the U.S. in the Chief Financial Officer's letter.

We trust that these submissions will fully satisfy requirements under the State of Louisiana regulations.

Very truly yours,

R. B. Tabakin
Manager, Regulatory Services

RBT:bf
rbtlet.1

CC: G. Campbell - Cytec Industries; JH
A. Junker - Cytec Industries; FO

CYTEC

CYTEC INDUSTRIES INC.
Five Garret Mountain Plaza
West Paterson, NJ 07424
(973) 357-3100

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

March 30, 1998

Mr. Dale Givens, Secretary
Office of the Secretary
Louisiana Department of Environmental Quality
P. O. Box 82263
Baton Rouge, LA 70884-2263

Reference: Cytec Industries Inc.
Westwego, LA 70094
EPA RCRA ID No. LAD008175390

Dear Mr. Givens:

I am the Chief Financial Officer of Cytec Industries Inc., Five Garret Mountain Plaza, West Paterson, NJ 07424. This letter is in support of the use of the financial test to demonstrate financial responsibility for liability coverage and closure and/or post-closure care as specified in LAC 33:V. Chapter 37 of the Louisiana Hazardous Waste Regulations (LHWR).

The firm identified above is the owner or operator of the following facilities for which liability coverage for sudden and non sudden accidental occurrences is being demonstrated through the financial test specified in LAC 33:V. Chapter 37. See Table I.

The firm identified above is the owner or operator of the following facilities in states other than Louisiana for which liability coverage is being demonstrated through a test equivalent or substantially equivalent to the financial test specified in LAC 33:V. Chapter 37. See Table I.

1. The firm identified above owns or operates the following facilities for which financial assurance for closure or post-closure care or liability coverage is demonstrated through the financial test specified in LAC 33:V. Chapter 37. The current closure and/or post-closure cost estimates covered by the test are shown for each facility: See Table I.

2. The firm identified above guarantees, through the corporate guarantee specified in LAC 33:V. Chapter 37, the closure and post-closure care or liability coverage of the following facilities owned or operated by its subsidiaries. The current cost estimates for the closure or post-closure care so guaranteed are shown for each facility: None.

3. In States other than Louisiana, this firm is demonstrating financial assurance for the closure or post-closure care of the following facilities through the use of a test equivalent or substantially equivalent to the financial test specified in LAC 33:V. Chapter 37. The current closure and/or post-closure cost estimates covered by such a test are shown for each facility: See Table I.

4. The firm identified above owns or operates the following hazardous waste management facilities for which financial assurance for closure or, if a disposal facility, post-closure care, is not demonstrated either to the U.S. Environmental Protection Agency or to a State through the financial test or any other financial assurance mechanism in LAC 33:V. Chapter 37 or equivalent or substantially equivalent State mechanisms. The current closure and/or post-closure cost estimates not covered by such financial assurance are shown for each facility: None.

5. This firm is the owner or operator of the following UIC facilities for which financial assurance for plugging and abandonment is required under 40 CFR Part 144. The current closure cost estimates as required by 40 CFR 144.62 are shown for each facility: See Table II.

This firm is required to file a Form 10-K with the Securities and Exchange Commission (SEC) for the latest fiscal year.

The fiscal year of this firm ends on December 31. The figures for the following items marked with an asterisk are derived from this firm's independently audited, year-end financial statements for the latest completed fiscal year, ended December 31, 1997.

Part B. Closure or Post-Closure Care and Liability Coverage

ALTERNATIVE II

1. Sum of current closure and post-closure cost estimates (total of all cost estimates listed above)	$ 12,218,517
2. Amount of annual aggregate liability coverage to be demonstrated	$ 12,000,000
3. Sum of lines 1 and 2	$ 24,218,517
4. Current bond rating of most recent issuance and name of rating service.	BBB (Standard & Poor's)
5. Date of issuance of bonds	March 15, 1998
6. Date of maturity of bonds	March 15, 2003 and March 15, 2008
7. (A)* Tangible net worth	$ 91,800,000
(B)* (if any portion of the closure and post-closure cost estimate is included in "total liabilities" on your financial statements, you may add the amount of that portion to this line).	$ 3,762,000
(C) Adjustment to reflect the increase to tangible net worth when accounting for "Employer's Accounting for Postretirement Benefits Other Than Pension (OPEB)" on a deferred recognition basis. (See U.S. EPA interpretation of federal RCRA requirement - Exhibit 1.)	$ 160,600,000
(D) Adjusted tangible net worth	$ 256,162,000
*8. Total assets in the U.S. (required only if less than 90% of assets are located in the U.S.)	$1,319,700,000
9. Is line 7 at least $10 million?	Yes
10. Is line 7 at least 6 times line 3?	Yes
*11. Are at least 90% of assets located in the U.S.? If not, complete line 12.	No
12. Is line 8 at least 6 times line 3?	Yes

I hereby certify that the wording of this letter is identical to the wording specified in LAC33:V.3719G as such regulations were constituted on the date shown immediately below.

Signature 

Name J. P. Cronin

Title Executive Vice President and Chief Financial Officer

Date March 30, 1998

A:\RTFAWLIS.LET

CYTEC INDUSTRIES INC.
FORTIER PLANT
LHWR FINANCIAL REQUIREMENTS

CERTIFICATION

I certify under penalty of the law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for false information, including the possibility of fine and imprisonment.

Jaswant S. Gill
Director – Manufacturing, Building Blocks

Table I

RCRA Financial Assurance
1998 Summary

Facility Location	Codes	EPA RCRA ID Number	Closure		Post-Closure		Sudden Liability		Non-Sudden Liability	
			Cost Estimate	Mechanism	Cost Estimate	Mechanism	Required Coverage[1]	Mechanism	Required Coverage[1]	Mechanism
Fortier, LA		LAD008175390	1,878,593	Financial Test	424,284	Financial Test	$5M/$5M	Financial Test	$3M/$6M	Financial Test
Havre de Grace, MD	2	MDD003075942	378,290	Letter of Credit	NA	NA	$1M/$2M	Financial Test	NA	NA
Kalamazoo, MI	–	MID005360680	155,403	Letter of Credit	NA	NA	$1M/$2M	Financial Test	NA	NA
Marietta, OH	–	OHD004341509	250,000	Financial Test	2,998,458	Financial Test	$1M/$2M	Financial Test	$3M/$6M	Financial Test
Anaheim, CA	–	CAT000610931	73,585	Financial Test	NA	NA	$1M/$2M	NA	$3M/$6M	NA
Wallingford, CT	2	CTD001173467	221,889	Financial Test	NA	NA	$1M/$2M	Financial Test	$3M/$6M	Financial Test
Willow Island, WV	2	WVD004341491	2,452,362	Financial Test	3,488,801	Financial Test	$1M/$2M	Financial Test	$3M/$6M	Financial Test
Total			5,410,122		6,911,543					
Less Amount Covered by Letter of Credit			(533,693)		(0)					
Net Total Covered by Financial Test			4,876,429		6,911,543		M$5		M$6	

Code Explanations

1. Per Occurrence/Annual Aggregate: M equals One Million.
2. Facilities in states using Federal requirements for RCRA Financial Assurance.

Table II

Underground Injection Facilities
Plugging and Abandonment
1998 Summary

Facility Location	EPA ID#	Cost Estimate	Mechanism
Fortier, LA	LAD008175390	$430,545	Financial Test

Table III

UST Financial Assurance
1998 Summary

Facility Location	# Petroleum USTs	Annual Aggregate Liability
Stamford, CT Wallingford, CT Orange, CA Perrysburg, OH	3 8 3 4	
Total # USTs	18	M$1.0

KPMG Peat Marwick LLP

New Jersey Headquarters
150 John F. Kennedy Parkway
Short Hills, NJ 07078

Independent Accountants' Report
on Applying Agreed-Upon Procedures

The Board of Directors
Cytec Industries Inc.:

We have performed the procedures enumerated below, which were agreed to by the board of directors and management of Cytec Industries Inc. (the Company) and subsidiaries, solely to assist the Company with respect to selected financial information included in the letter dated March 27, 1998 from the chief financial officer of the Company to the Louisiana Department of the Environment (the Letter). This engagement to apply agreed-upon procedures was performed in accordance with standards established by the American Institute of Certified Public Accountants. The sufficiency of the procedures is solely the responsibility of the Company. Consequently, we make no representation regarding the sufficiency of the procedures described below either for the purpose for which this report has been requested or for any other purpose.

The procedures and the associated findings are as follows:

1. We compared the dollar amount of adjusted tangible net worth ($256,162,000), as shown in the Letter, to a schedule prepared by the Company and found the amount to be in agreement. Adjusted tangible net worth was calculated as follows:

   a. Consolidated total shareholders' equity of $387,400,000 was reduced by intangible assets (goodwill) of $295,600,000, both as reported in the audited consolidated 1997 balance sheet of the Company, resulting in tangible net worth of $91,800,000 as shown in the letter.

   b. Tangible net worth was then increased by the sum of (i) the postretirement benefit other than pension obligations of $160,600,000 as computed under the provisions of Financial Accounting Standards 106, which for purposes of this letter and as advised by counsel to the Company that the underlying state or federal regulation permit

recognition on a deferred basis; and, therefore such amount was added back to tangible net worth; and (ii) the post-closure cost estimate of $3,762,000 included as part of total liabilities as reported in the audited consolidated 1997 balance sheet of the Company.

2. Total Assets in the United States – We compared Total Assets in the United States ($1,319,700,000), as shown in the Letter, to the corresponding amount in a schedule prepared by the Company, derived from the underlying accounting records of the Company, and found such amount to be in agreement. We compared the amounts included on such schedule to the Company's accounting records and found such amounts to be in agreement. The amounts on such schedule are the source for calculating the amounts of identifiable assets as disclosed in Note 17, Operations by Geographic Areas, in the 1997 consolidated financial statements.

We were not engaged to, and did not, perform an audit, the objective of which would be the expression of an opinion on the specified elements, accounts or items. Accordingly, we do not express such an opinion. Had we performed additional procedures, other matters might have come to our attention that would have been reported to you.

This report is intended solely for the use of the board of directors and management of Cytec Industries Inc. and should not be used by those who have not agreed to the procedures and taken responsibility for the sufficiency of the procedures for their purposes. However, this report is a matter of public record and its distribution is not limited.

March 27, 1998

KPMG Peat Marwick LLP

Reference Sheet

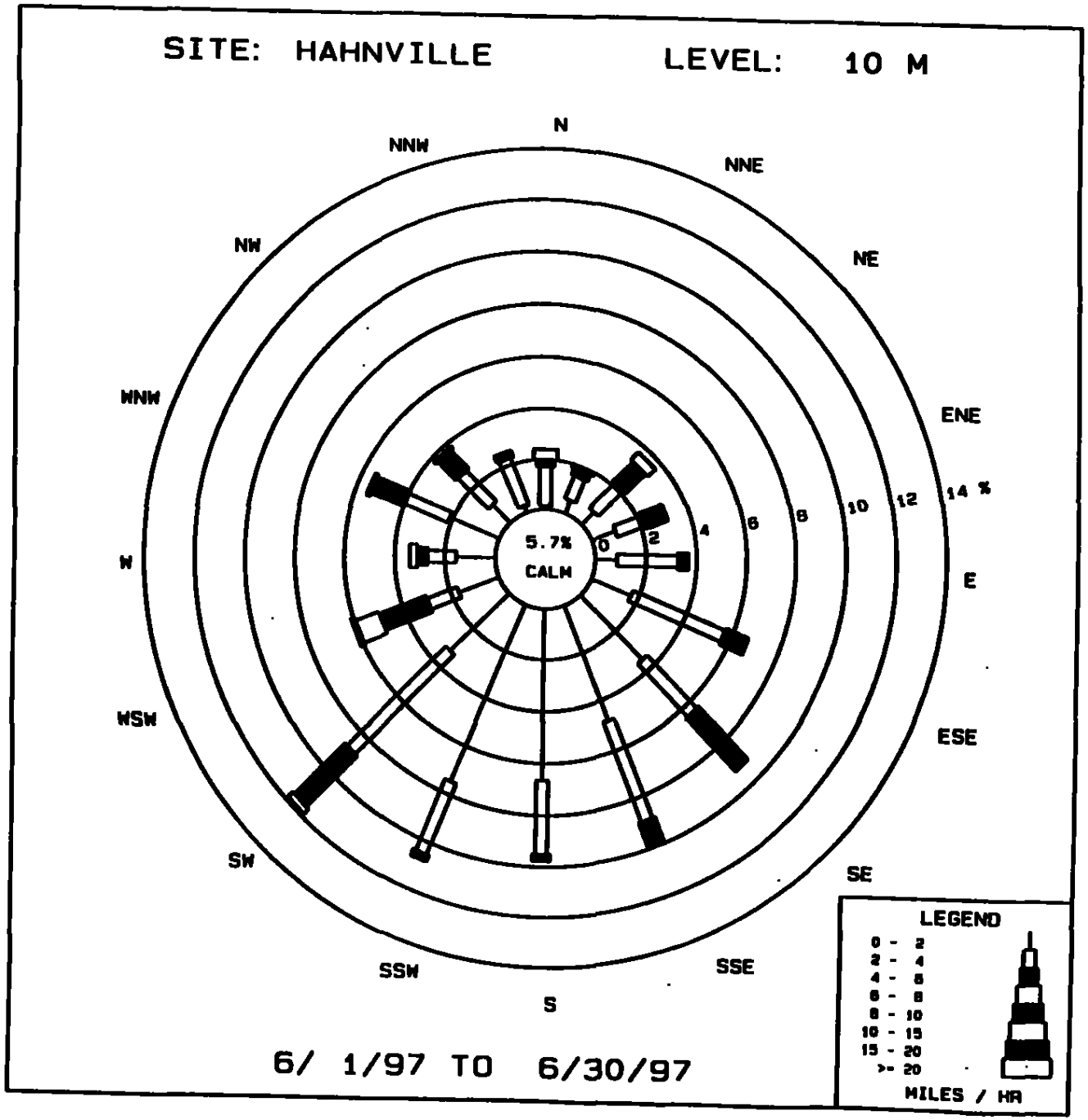
REF+51908

12/29/99 10:38 AM

Appendix X

LAC 33:V.517.S

Wind Rose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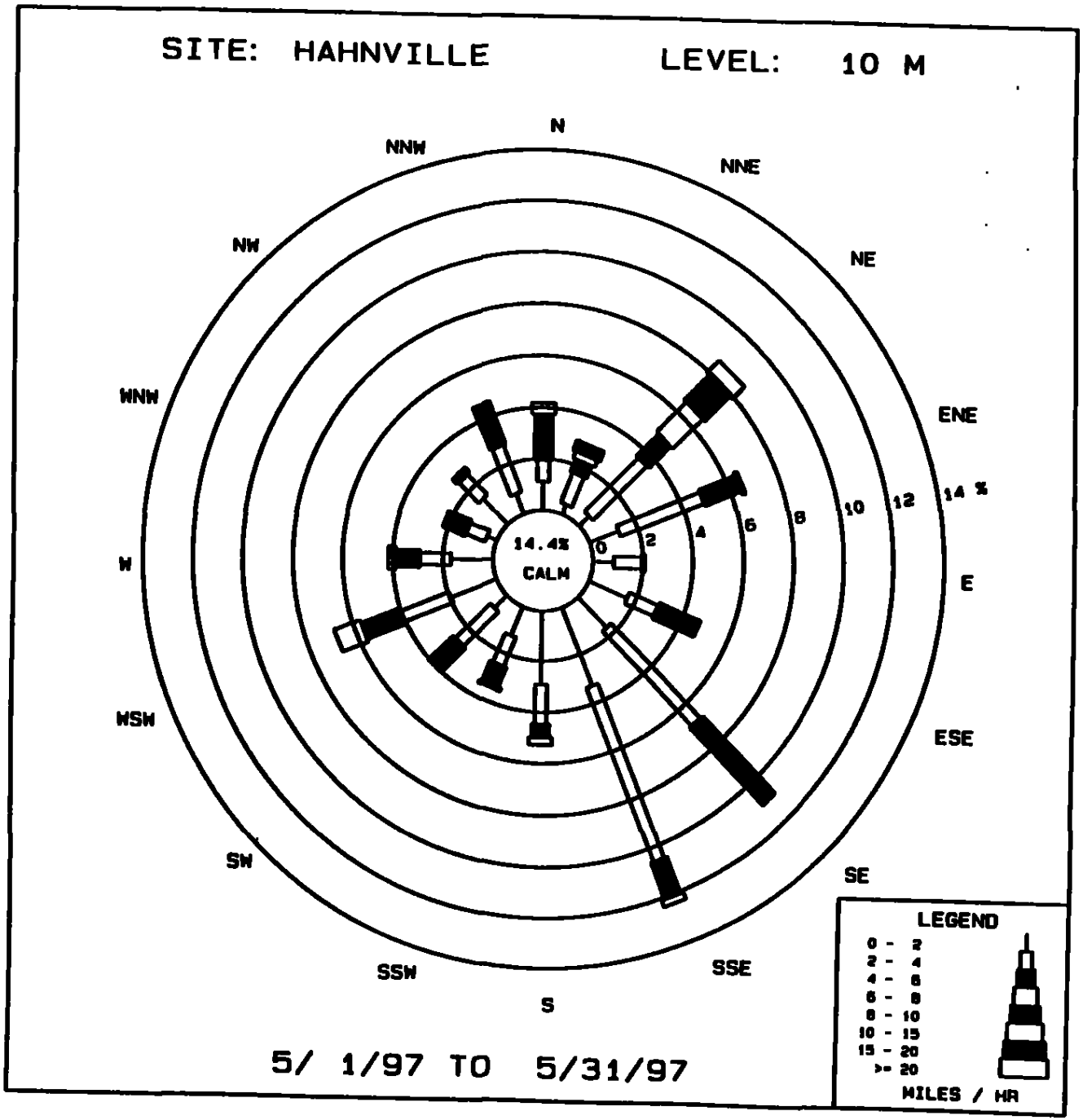
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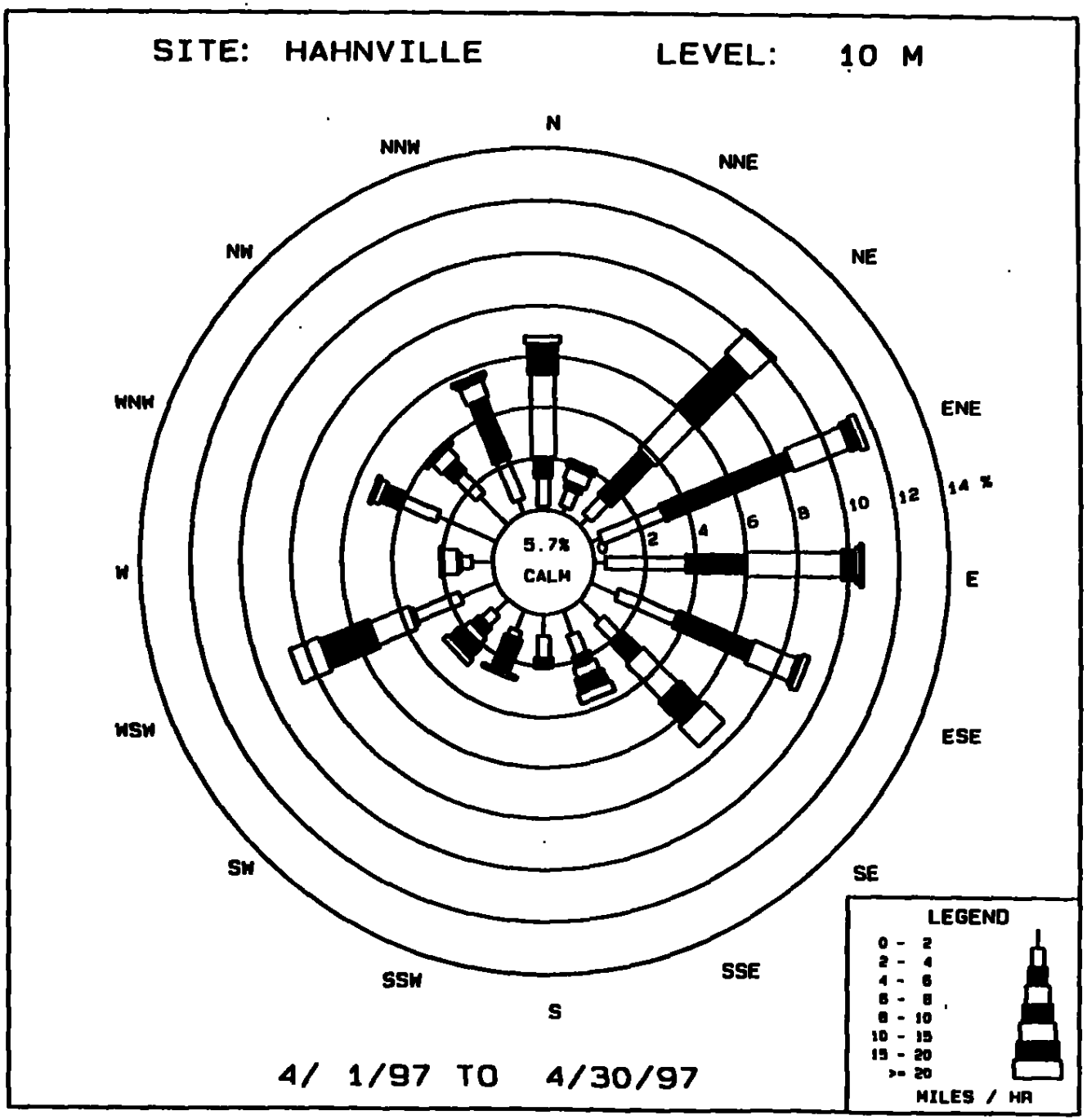
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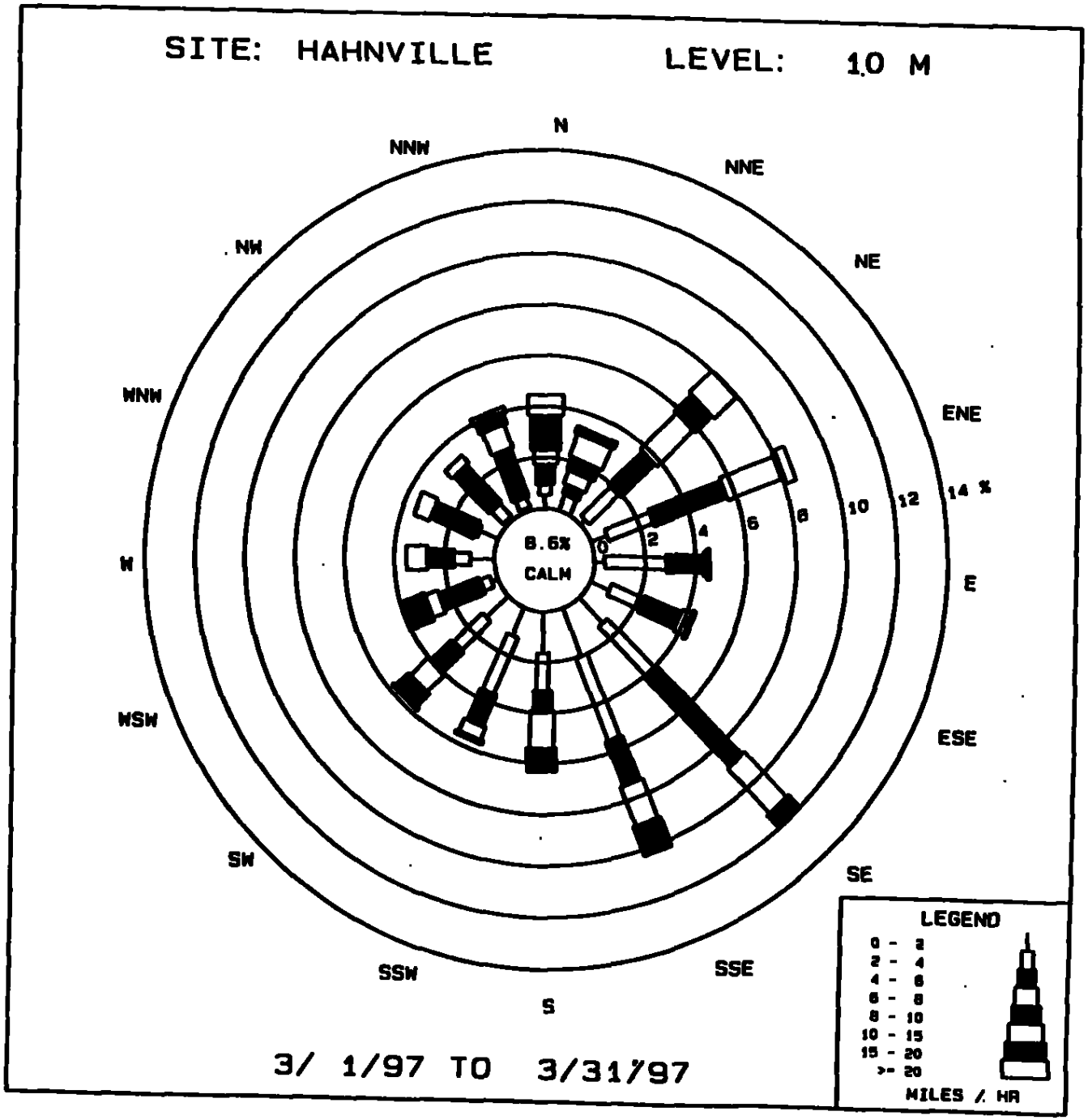
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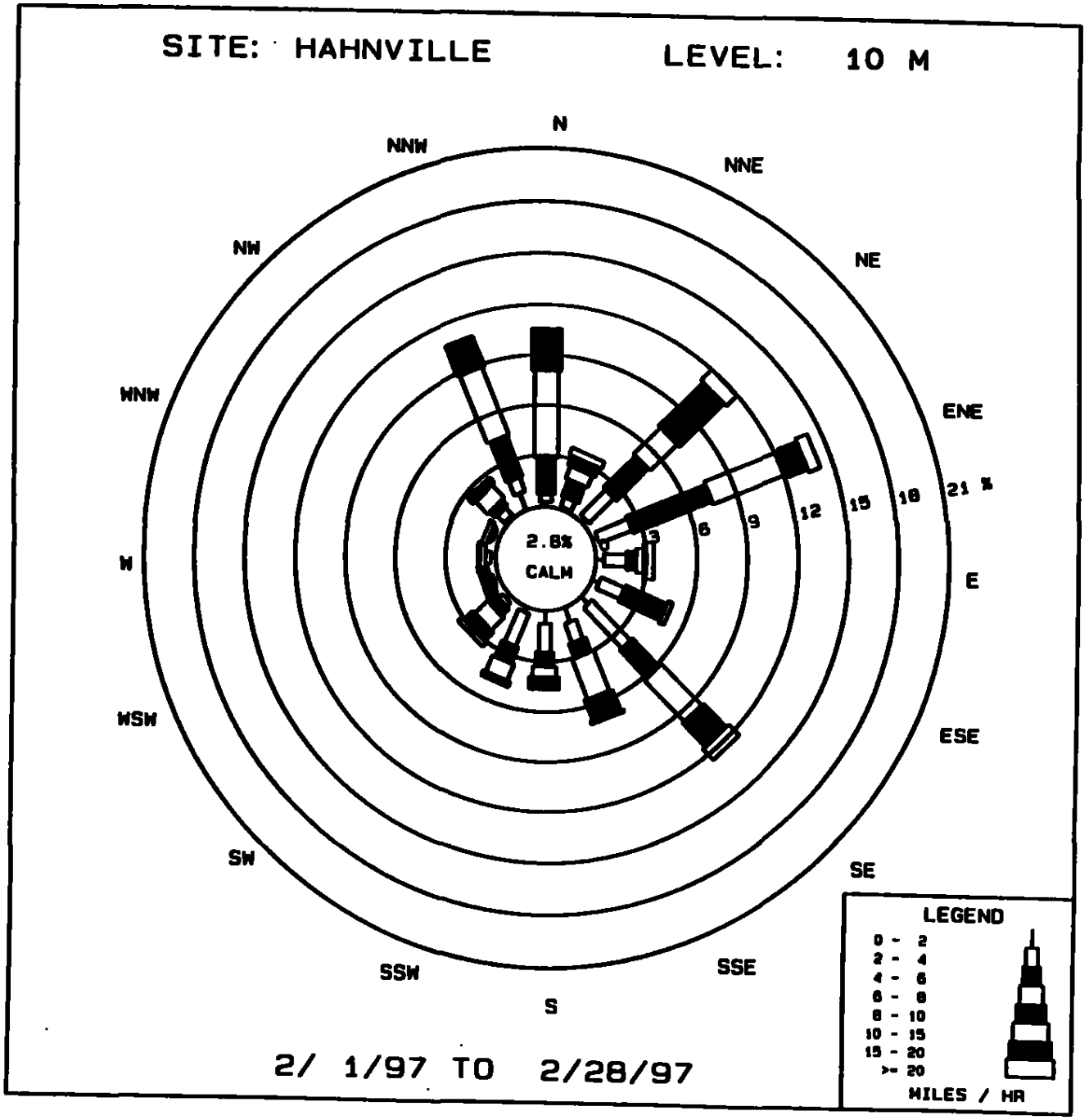
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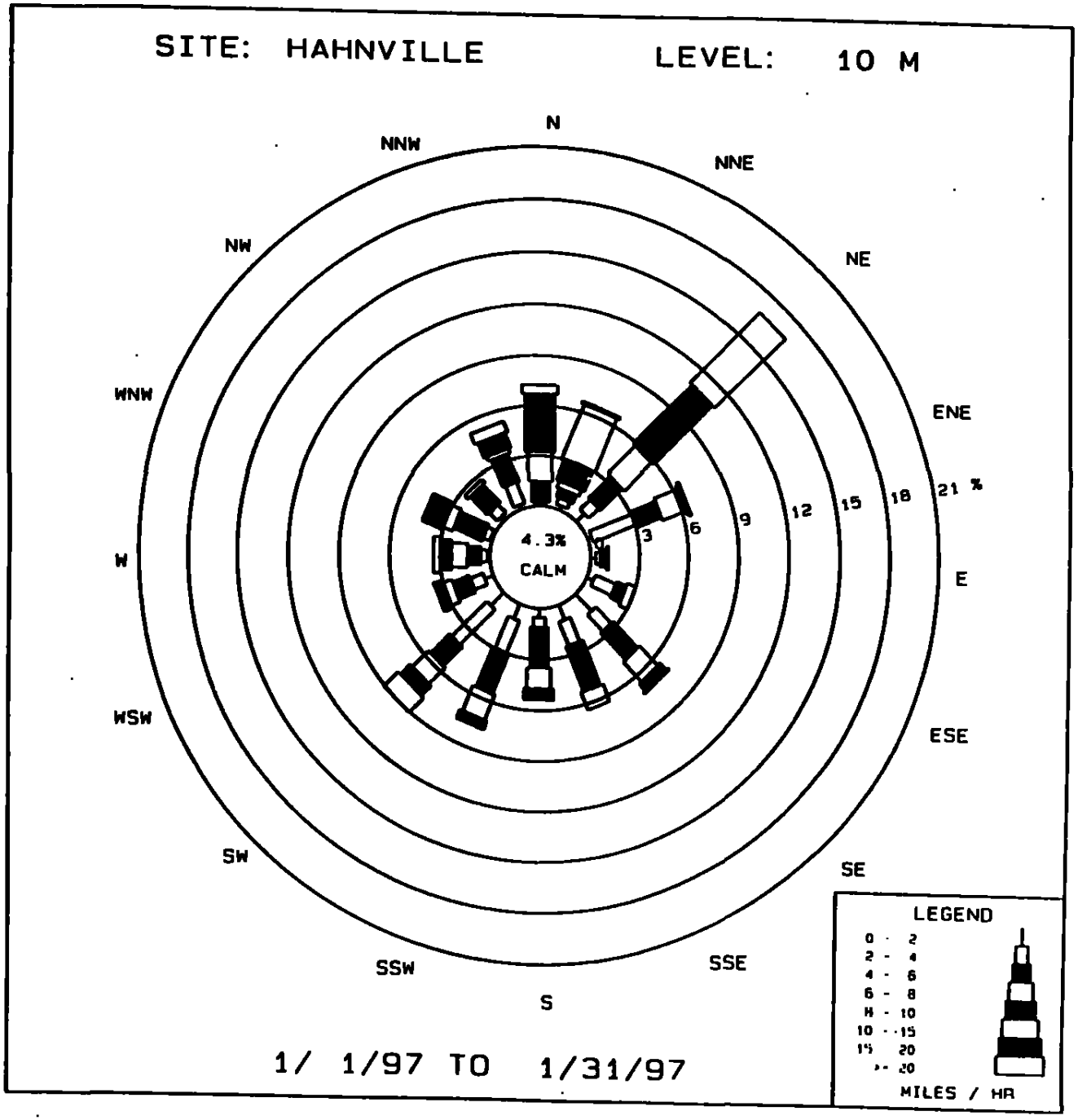
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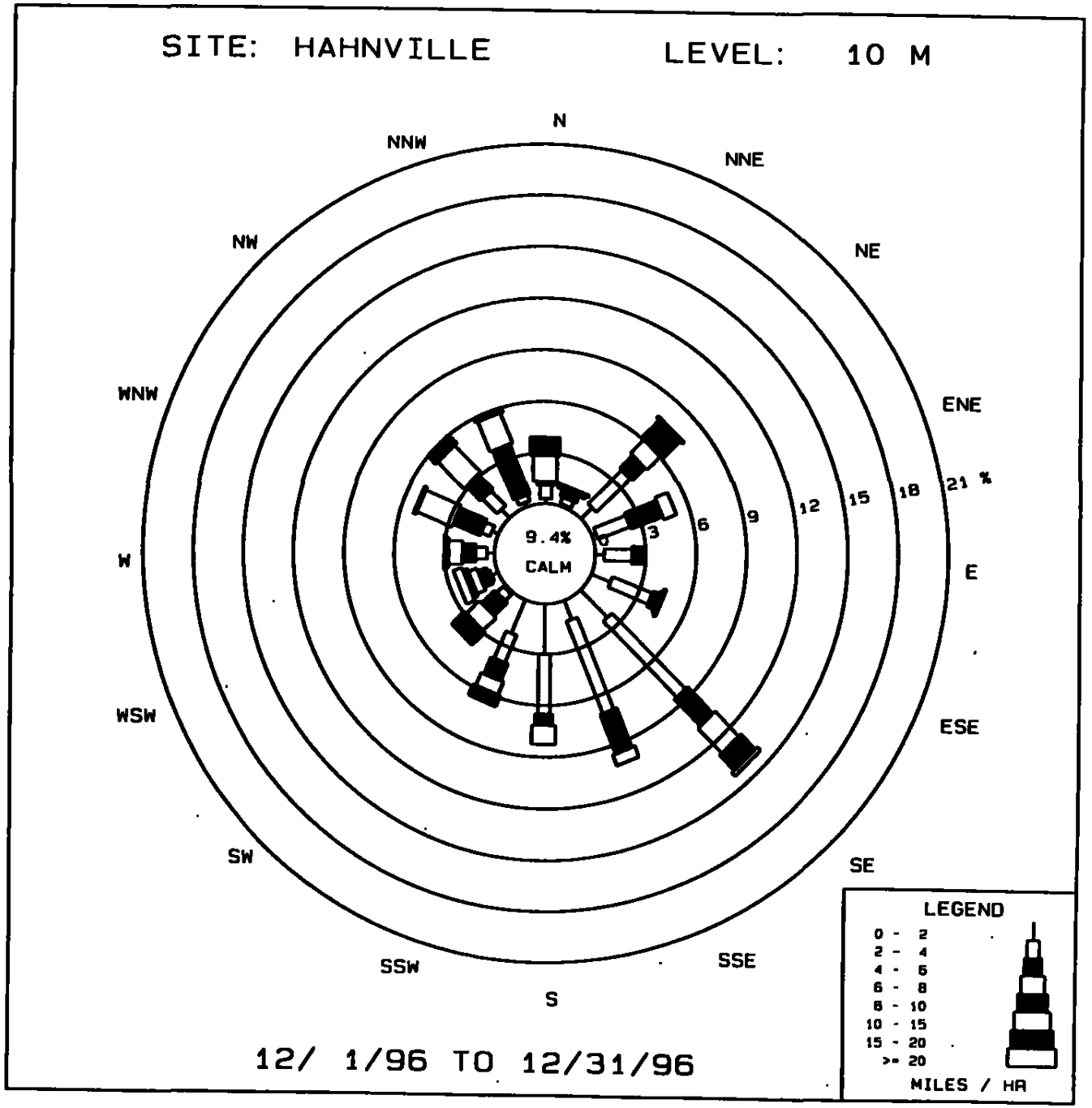
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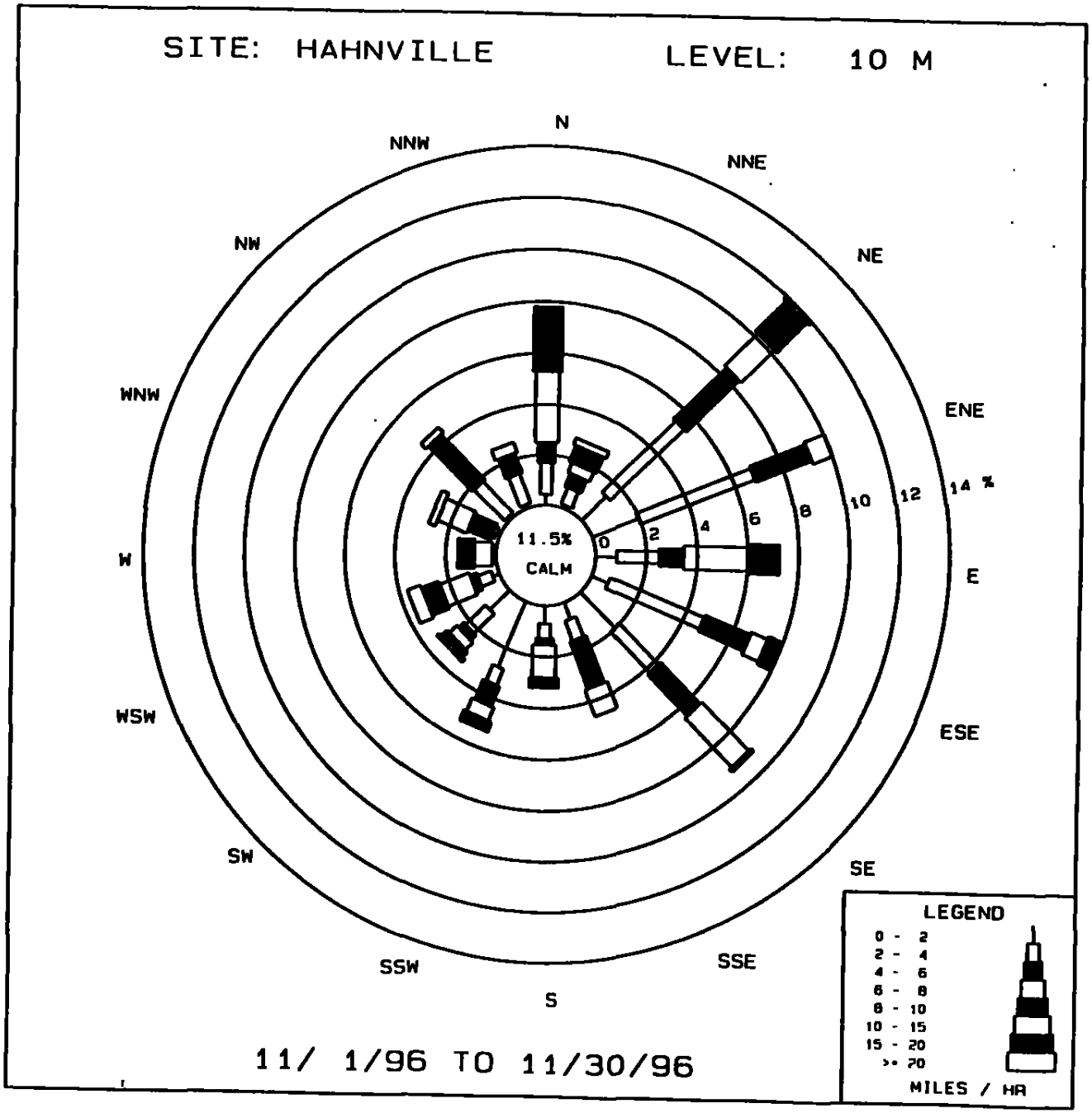
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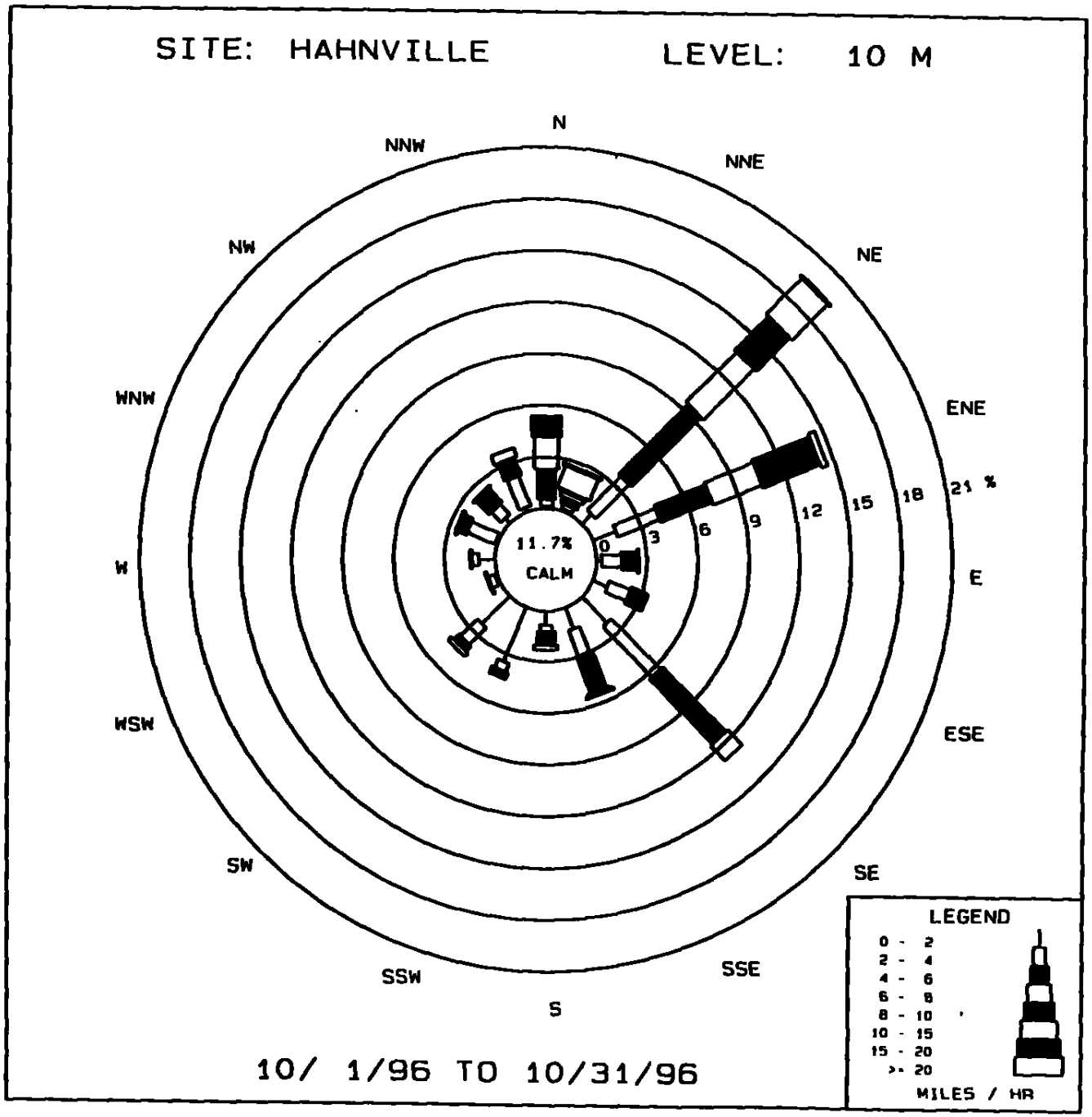
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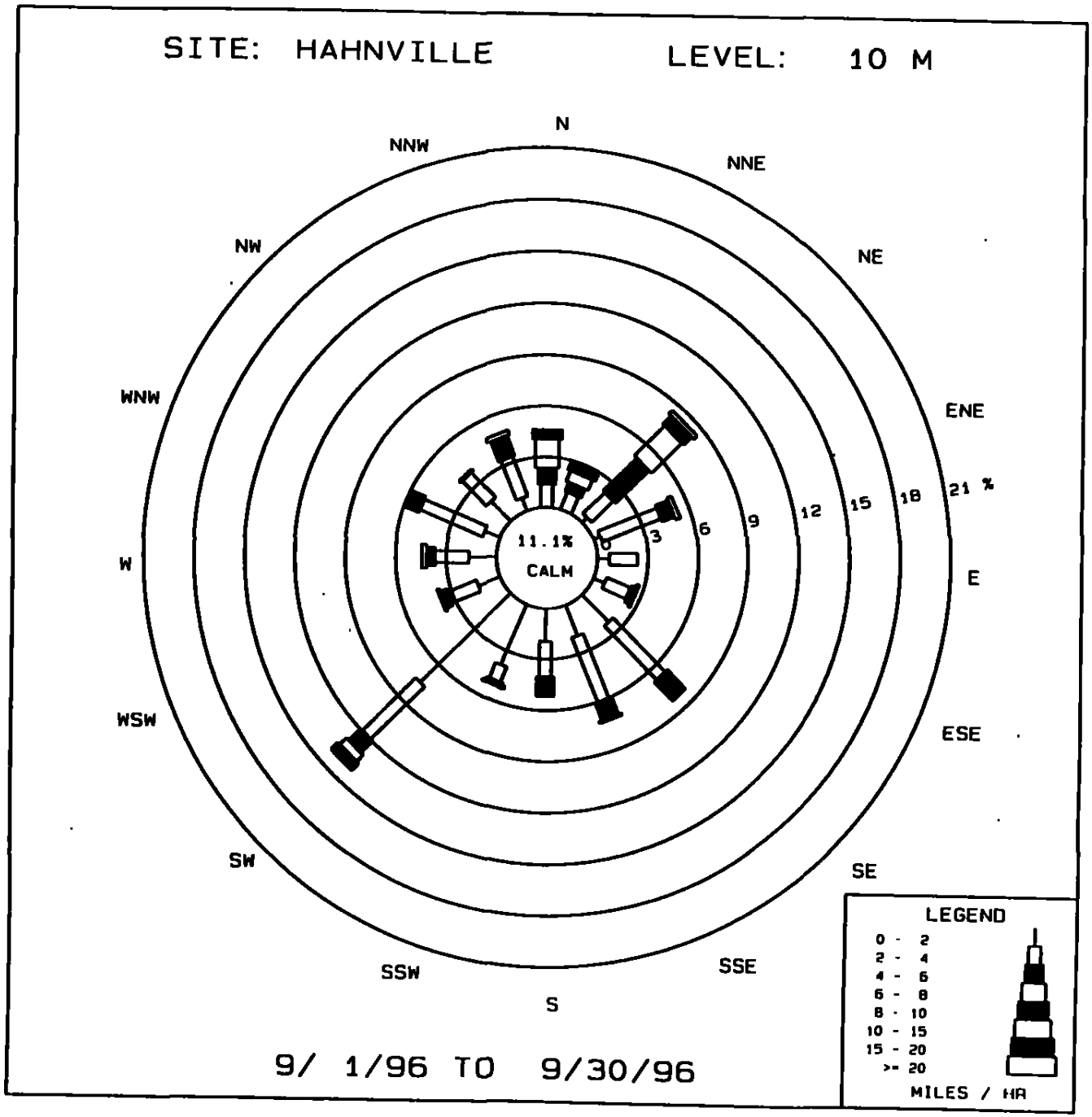
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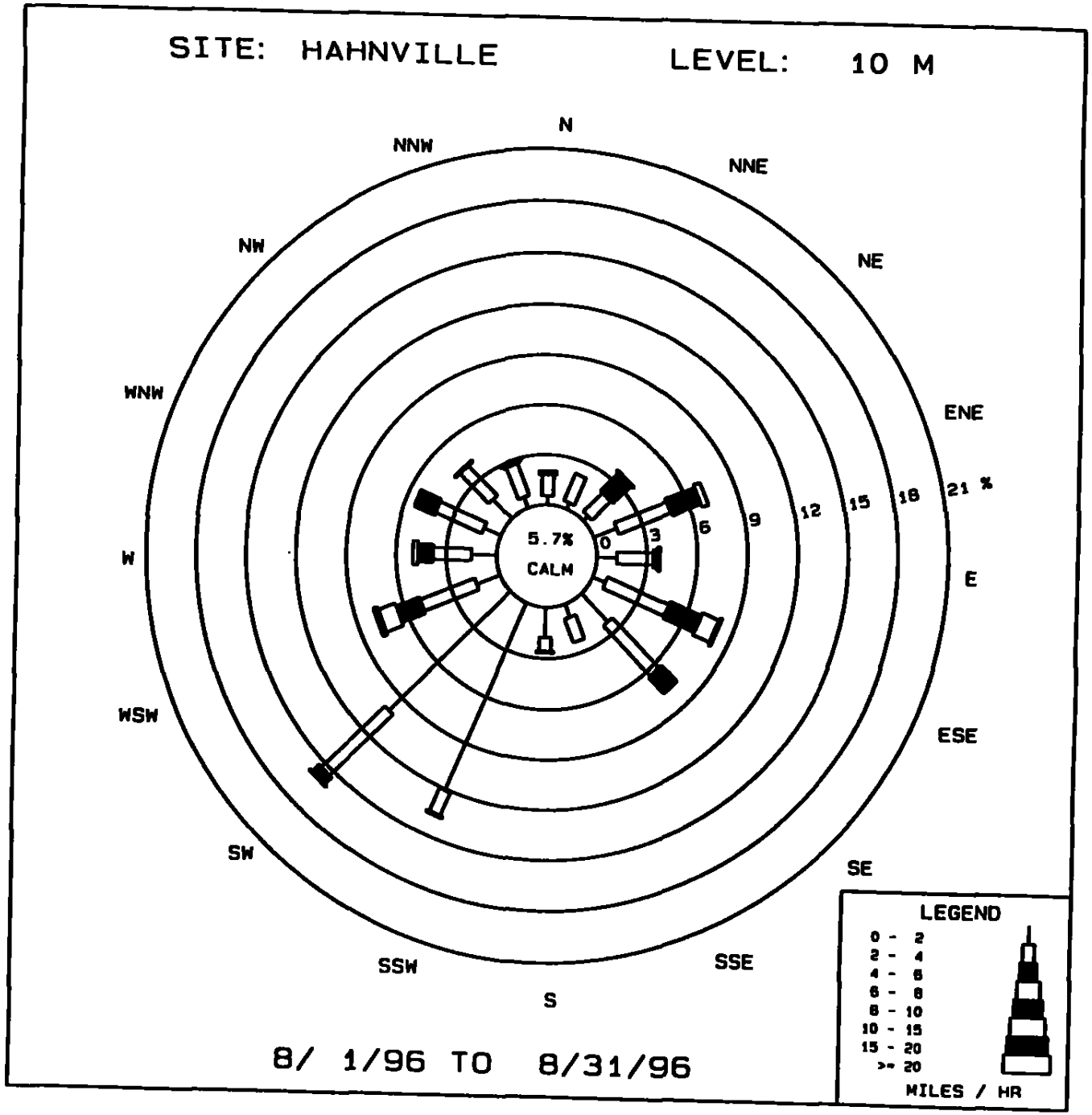
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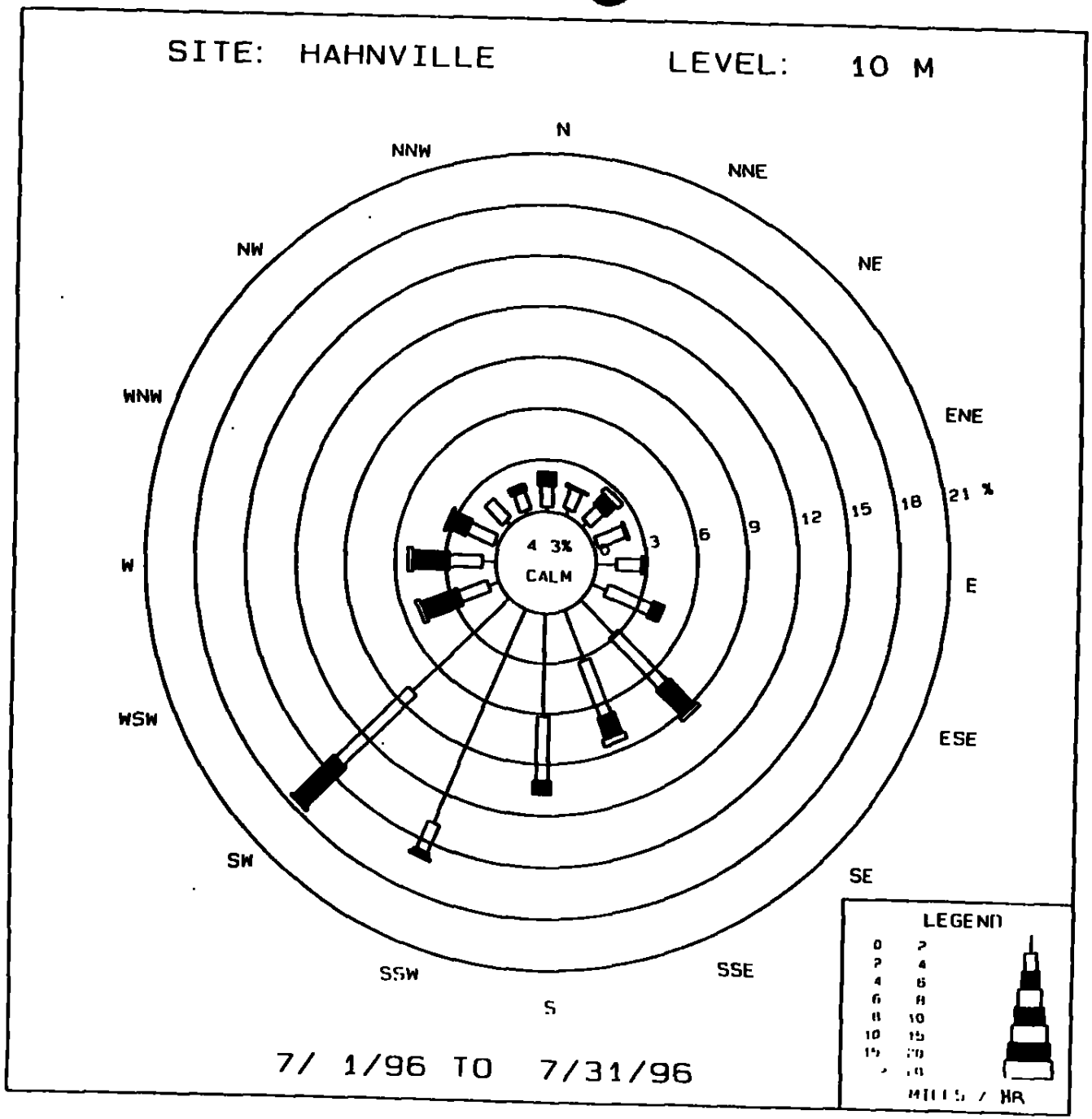
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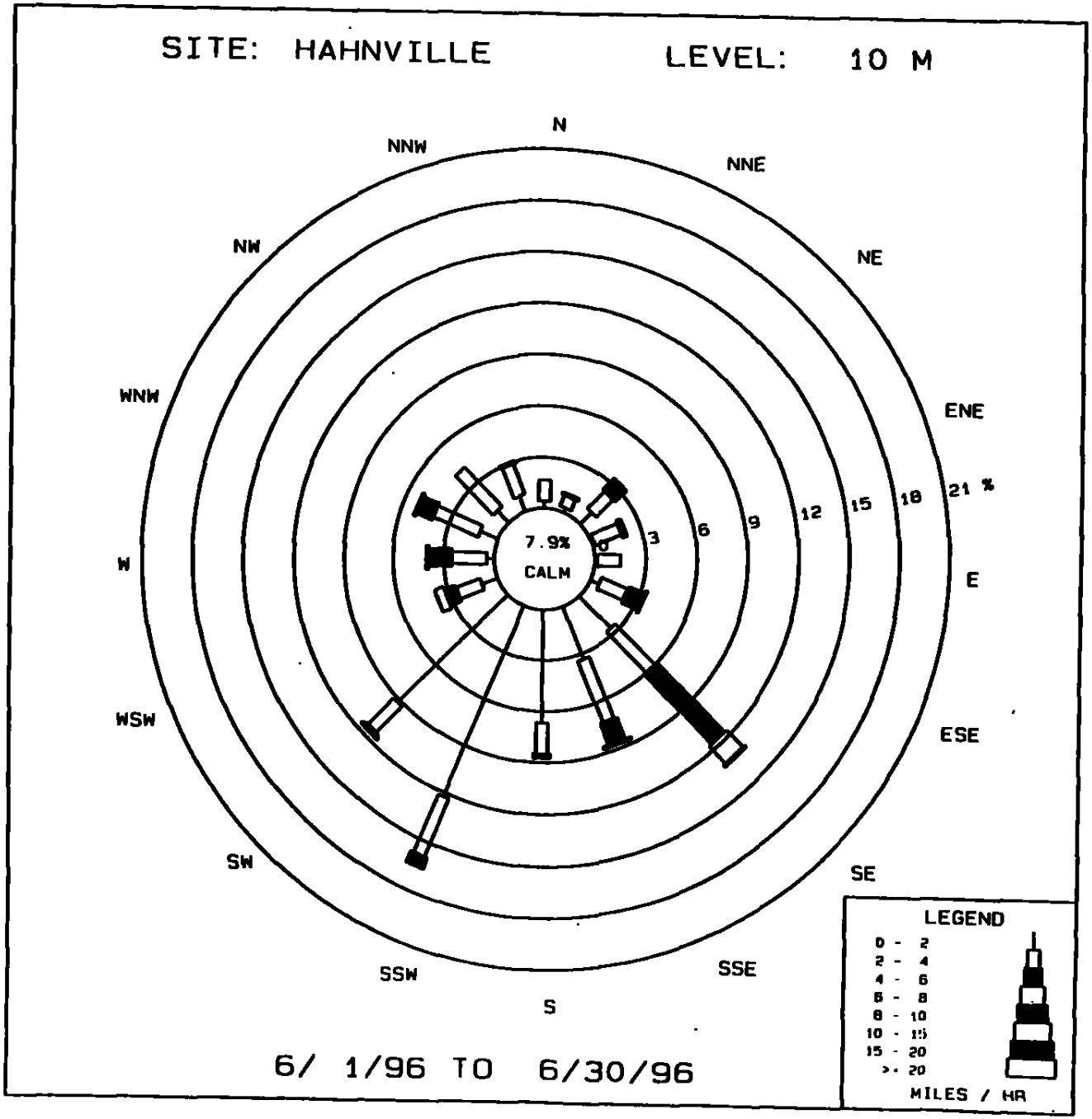
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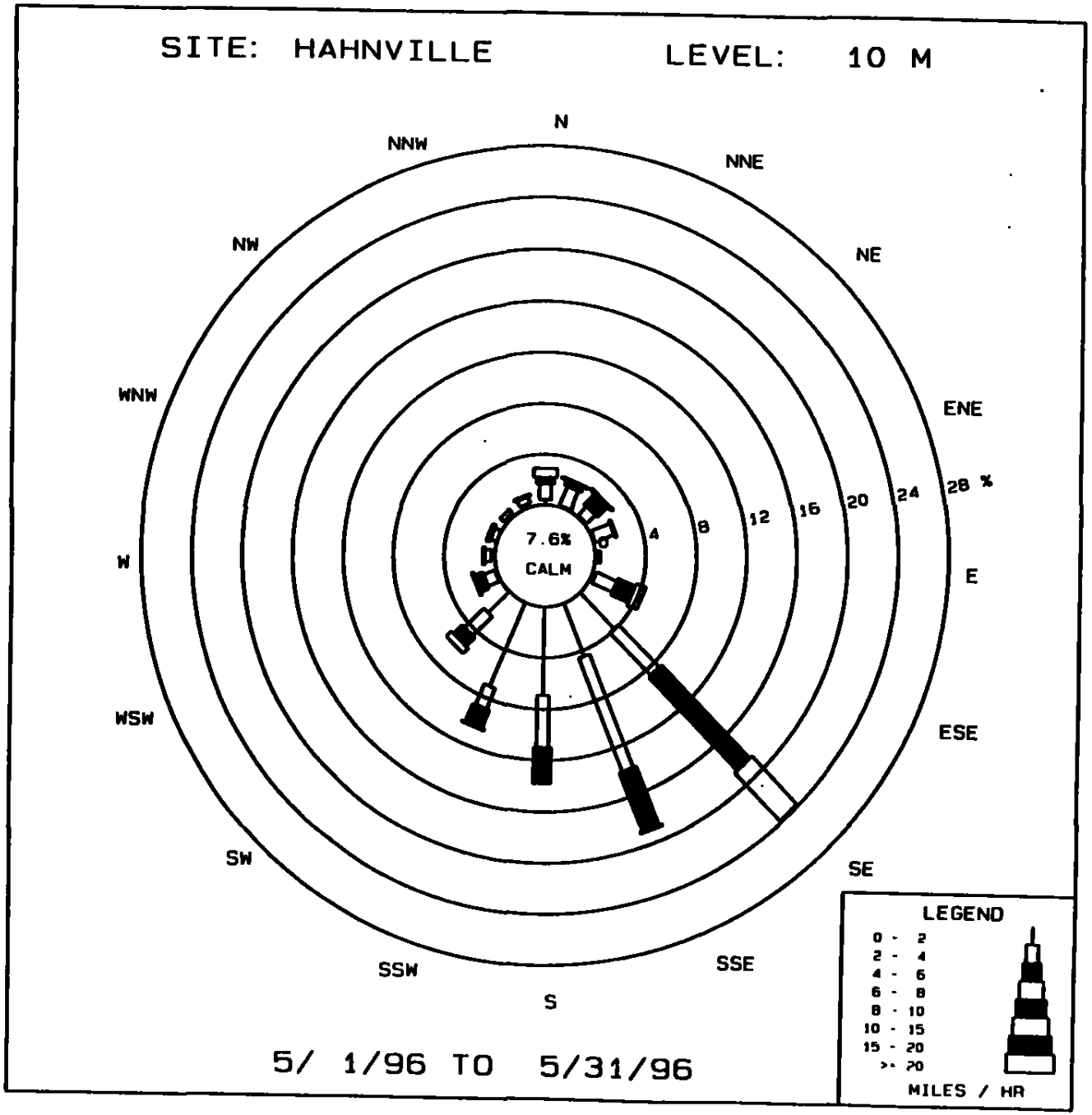
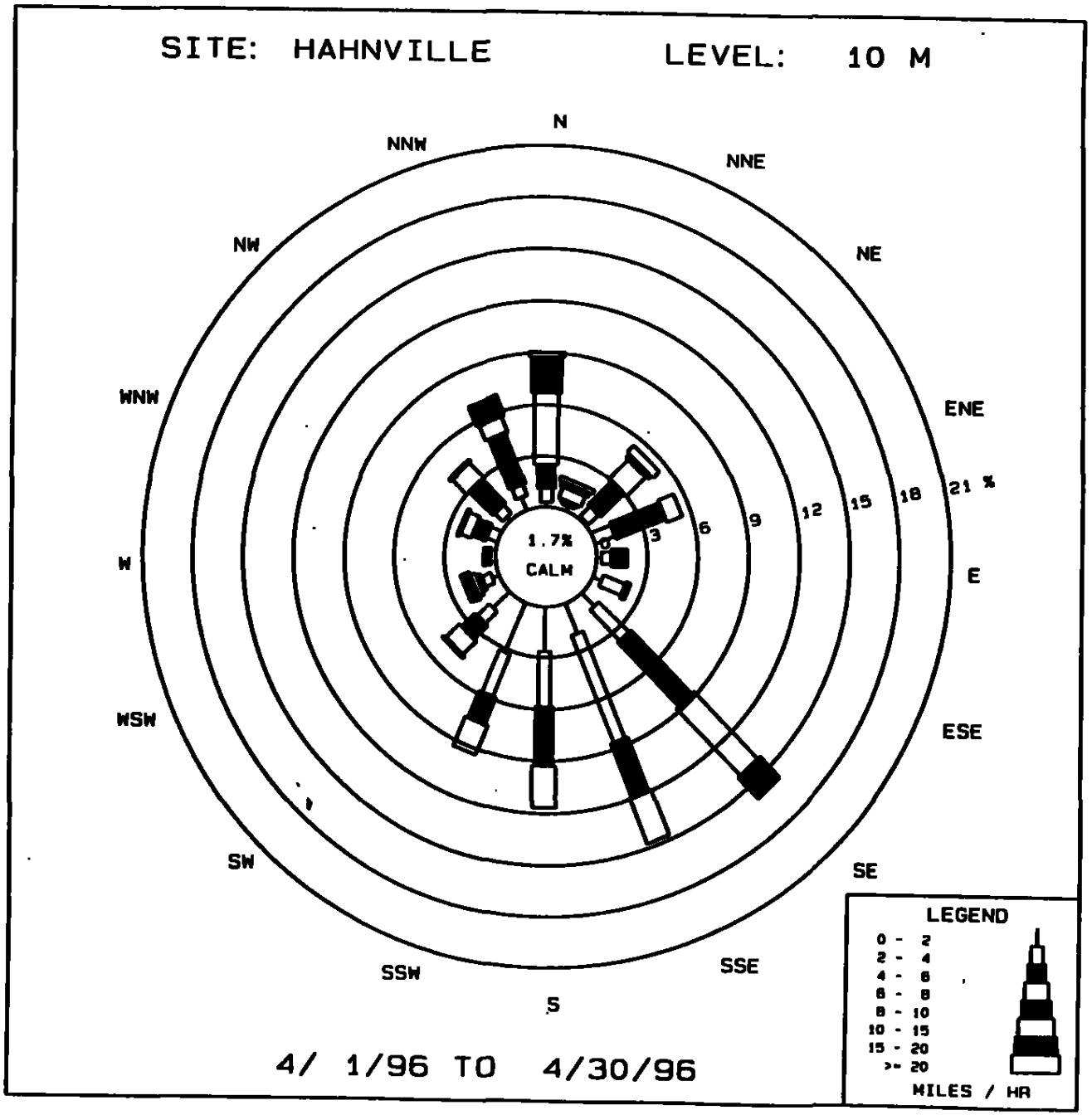
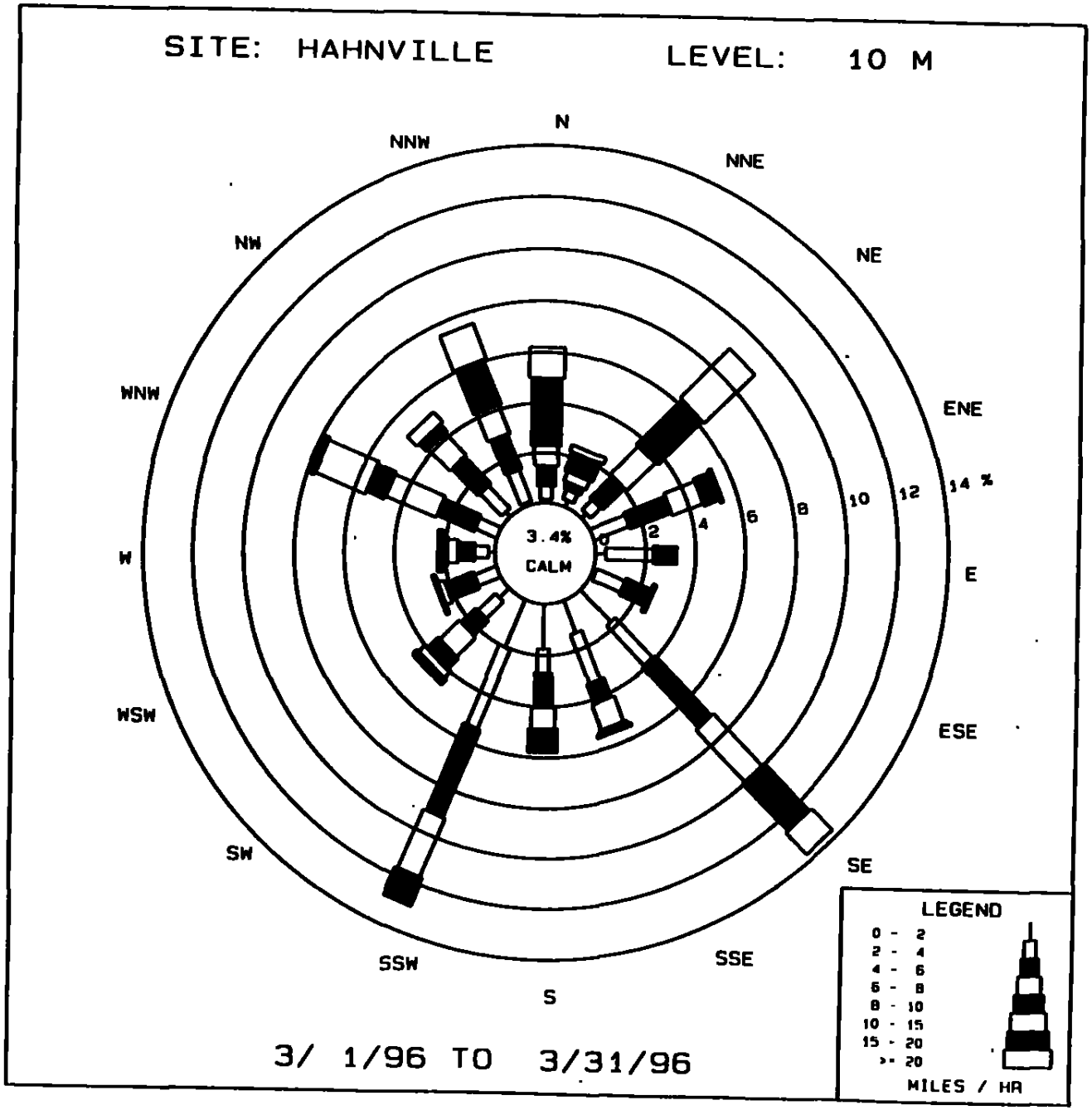
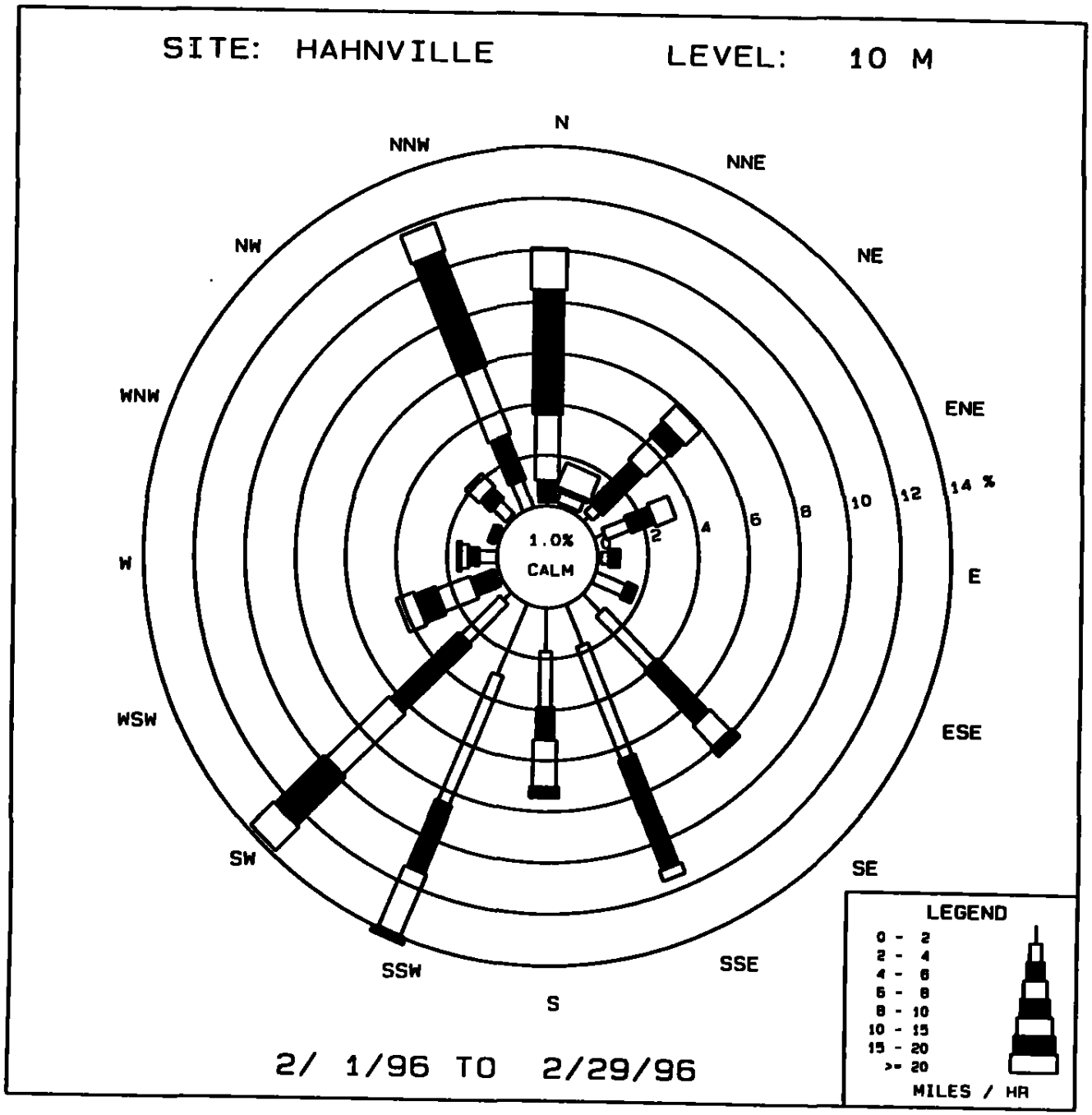
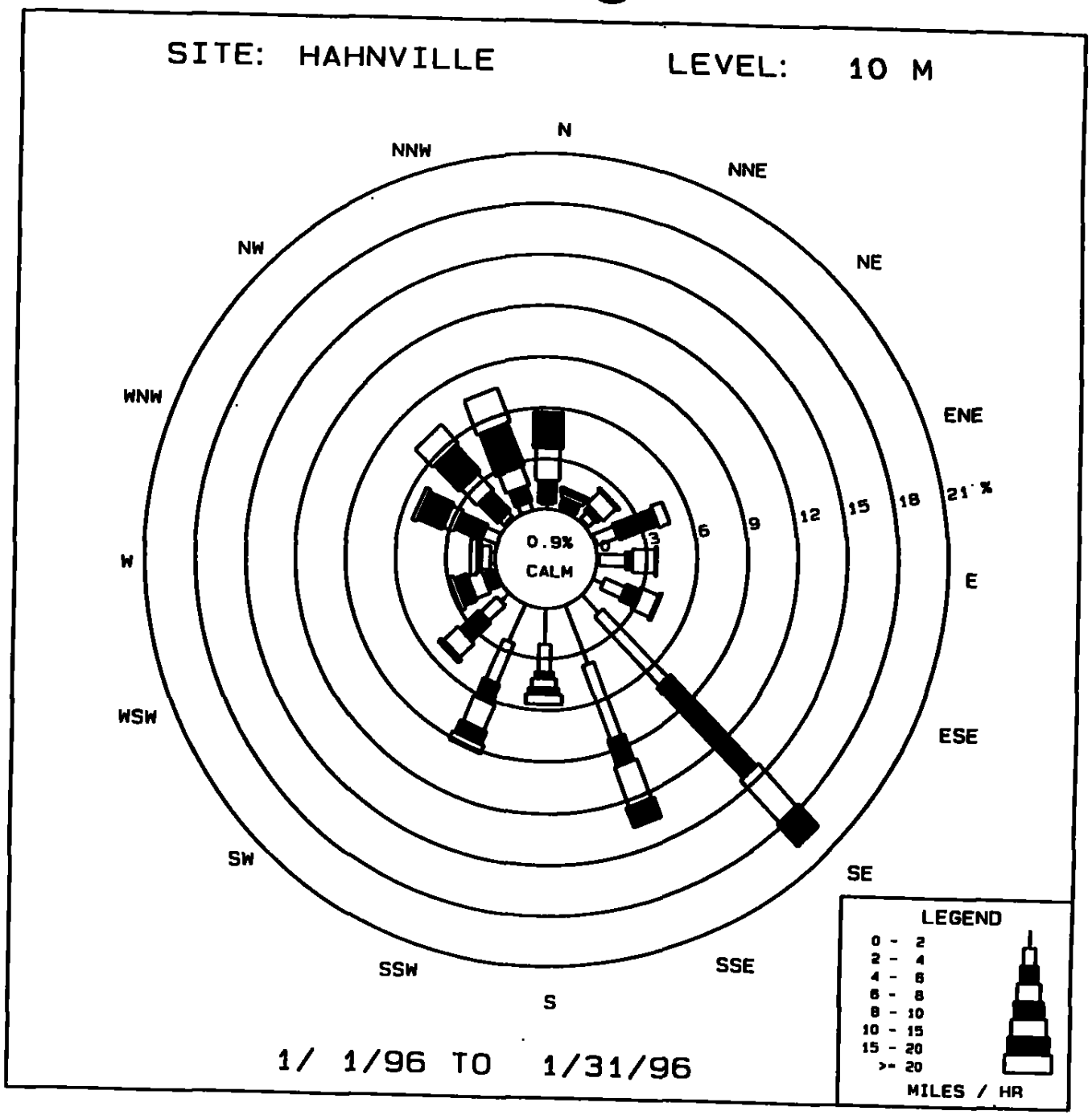
6
3
7.9%
CALM
LEGEND
0 - 2
2 - 4
4 - 6
6 - 8
8 - 10
10 - 15
15 - 20
>. 20
MILES / HR
6/ 1/96 TO 6/30/96


SITE: HAHNVILLE
LEVEL: 10 M
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
4
8
12
16
20
24
28 %
7.6%
CALM
LEGEND
0 - 2
2 - 4
4 - 6
6 - 8
8 - 10
10 - 15
15 - 20
>= 20
MILES / HR
5/ 1/96 TO 5/31/96


SITE: HAHNVILLE
LEVEL: 10 M
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
21 %
18
15
12
9
6
3
1.7%
CALM
LEGEND
0 - 2
2 - 4
4 - 6
6 - 8
8 - 10
10 - 15
15 - 20
>= 20
MILES / HR
4/ 1/96 TO 4/30/96


SITE: HAHNVILLE
LEVEL: 10 M
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
14 %
12
10
8
6
4
2
0
3.4%
CALM
LEGEND
0 - 2
2 - 4
4 - 6
6 - 8
8 - 10
10 - 15
15 - 20
>- 20
MILES / HR
3/ 1/96 TO 3/31/96


SITE: HAHNVILLE
LEVEL: 10 M
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
14 %
12
10
8
6
4
2
0
1.0%
CALM
LEGEND
0 - 2
2 - 4
4 - 6
6 - 8
8 - 10
10 - 15
15 - 20
>= 20
MILES / HR
2/ 1/96 TO 2/29/96


SITE: HAHNVILLE
LEVEL: 10 M
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
0.9%
CALM
3
6
9
12
15
18
21 %
LEGEND
0 - 2
2 - 4
4 - 6
6 - 8
8 - 10
10 - 15
15 - 20
>= 20
MILES / HR
1/ 1/96 TO 1/31/96

Appendix Y

LAC 33:V.517.T.
LAC 33:V.1503.A.3

Seismic Standard

4.0 AREA GEOLOGY

This section presents a discussion of the local geology and hydrology within the Cytec geologic study area, relevant to the extension of the 10,000-year plume to the north of the plume presented in the 1990 No-Migration Petition application. A full discussion of the local topography, physiography, geology and hydrology within the Cytec geologic study area and of the regional geologic environment at and surrounding the Cytec facility, including the regional surface geology, hydrology, subsurface geology, depositional history, stratigraphy, structure, seismicity, and hydrogeology, can be found in the May 1990 No-Migration Petition document. Information included herein has been excerpted from the above referenced document and has been revised and updated as appropriate.

Combined with results from the AOR search and pressure and flow modeling, the regional and local geologic studies demonstrate that the Cytec injection wells meet the USEPA geologic and siting requirements for Class I injection wells. Also, this demonstration identifies the strata within the injection zone which will confine fluid movement above the injection interval and includes a demonstration that this strata is free of known vertically transmissive faults or fractures, and that there is a confining zone above the injection zone.

4.1 Local Geology

Information on the local geology of the area covered by the newly defined 10,000-year plume, to the north of the previously approved (1990) petition model 10,000-year plume, is presented in the following subsections. For this modification, the local geologic area of study has been extended to provide sufficient geologic data for modeling and mapping geologic trends. The study area includes a region with limits defined as: 1) the 2-mile radius AOR circle, with the Cytec injection wells located at the center, and 2) all of the additional area encompassed to the north of that circle by the boundary of the 10,000-year injectate plume.

monoclinal South dip present at the Fortier facility. No faulting within the confining zone occurs within the study area. Structure at the base of the lowermost USDW, which is separated from the confining zone by the buffer aquifer/aquiclude, also reflects the structure of the deeper horizons (Figure 5-28).

STRUCTURAL GEOLOGY-INJECTION ZONE

Two structure contour maps, Figures 5-25 and 5-27, were prepared to illustrate the local structure on top of the injection zone and on the top of the 2400' Sand, within the area of review . Facies changes occurring in both the dip and strike directions complicated precise stratigraphic correlation; however, no faulting was observed within the vicinity of the site. Faulting controls oil and gas production at Good Hope and East Good Hope Fields, located 4 to 5 miles northwest of the injection facility. However, the faulting in the fields is confined to deeper Miocene horizons (-10,000') and does not extend into the shallower injection intervals or overlying aquicludes. Therefore, injection well operations will not be affected by faulting.

Simple monoclinal dip dominates the regional structure at the top of the injection zone. No major structural aberrations or faulting are apparent. Locally, subtle structural dip variations are present in the map contours at the top of the injection zone (Figure 5-25). The absence of faulting or intensely deformed structure within the stratigraphic sequence provides additional evidence for the suitability of the American Cyanamid injection zone.

SEISMIC ACTIVITY AND INDUCED SEISMICITY

The Fortier Plant is located in one of the regions of the United States which has a very low occurrence of seismic activity. A seismic risk map, Figure 5-29 , was created based on past seismic events. The plant is located in an earthquake risk zone of 1. All recorded earthquakes within the study area are listed in Table 5-E . Figure 5-30 locates the epicenter of each earthquake. One should note that in Table 5-E, the close grouping of several earthquakes is probably due to duplication from measurement error. All recorded earthquakes have been of low intensity, ranging from I to VI on the Mercalli scale. There is little risk of damage from intensity level VI earthquakes. For example, damage to underground pipes would be expected only at intensity levels of IX or greater.

Two supplemental regional structure maps are included as Figure 5-3 and 5-5 to further delineate the fault patterns and structural geology at the American Cyanamid plant site. The 1" to 15 mile regional structure map (Figure 5-3) taken from GEOMAP display the regional faulting pattern of South Louisiana and the location of the plant relative to the faulting. The 1" to 4000' local structure map (Figure 5-27) depicts the faulting during Middle Miocene time and its' relation to the plant site. The injection intervals used by American Cyanamid consist of Pliocene and Upper Miocene sands and are not affected by the earlier faulting.

Regionally the potential for open fracture systems in the Gulf Coastal Plain is virtually non-existent because of the unconsolidated nature of the sediment. Fractures that could possibly form in the sediments due to folding and faulting are self healing because of the plastic nature of the shales and the flowing characteristics of the unconsolidated sands.

The potential for inducing an earthquake at the Fortier Plant by injection would not be expected for two reasons: (1) the relaxed state of tectonic stress and (2) the absence of faulting. Earthquakes are most likely to occur in tectonically active areas where the natural stress state, prior to injection, is already close to failure. The Gulf Coast geologic province is a tectonically relaxed area which does not possess the geologic features necessary for generating major seismic activity (Hubbert and Willis, 1972, Raleigh, 1972).

A pre-existing zone of weakness or a fault must be present for injection to induce an earthquake. The absence of faults within the area of review significantly reduces the risk of earthquakes. This is not to suggest that the Gulf Coast geologic province is not highly faulted. Gulf Coast growth faults have developed as a consequence of rapid loading of large quantities of sand and mud on top of thick, unconsolidated shales (Loucks et al., 1986). However, in contrast to faults located in the rigid basement rock of the mid-continent or western United States, Gulf Coast faults originate in plastic sediments. Because they are highly porous and permeable and fluid-saturated, Gulf Coast sediments behave plastically, deforming gradually and continuously under stress (Price, 1972). For this reason, Gulf Coast sediments do not retain a high stress level. Rigid basement rock, on the other hand, behaves elastically under stress. Stress builds, but the rock does not deform, until the critical stress is reached causing catastrophic failure.

The absence of tectonic stress and faults in the area of review supports the conclusion that injection practices at the Fortier Plant would not be expected to induce earthquakes.

MINERAL RESOURCES

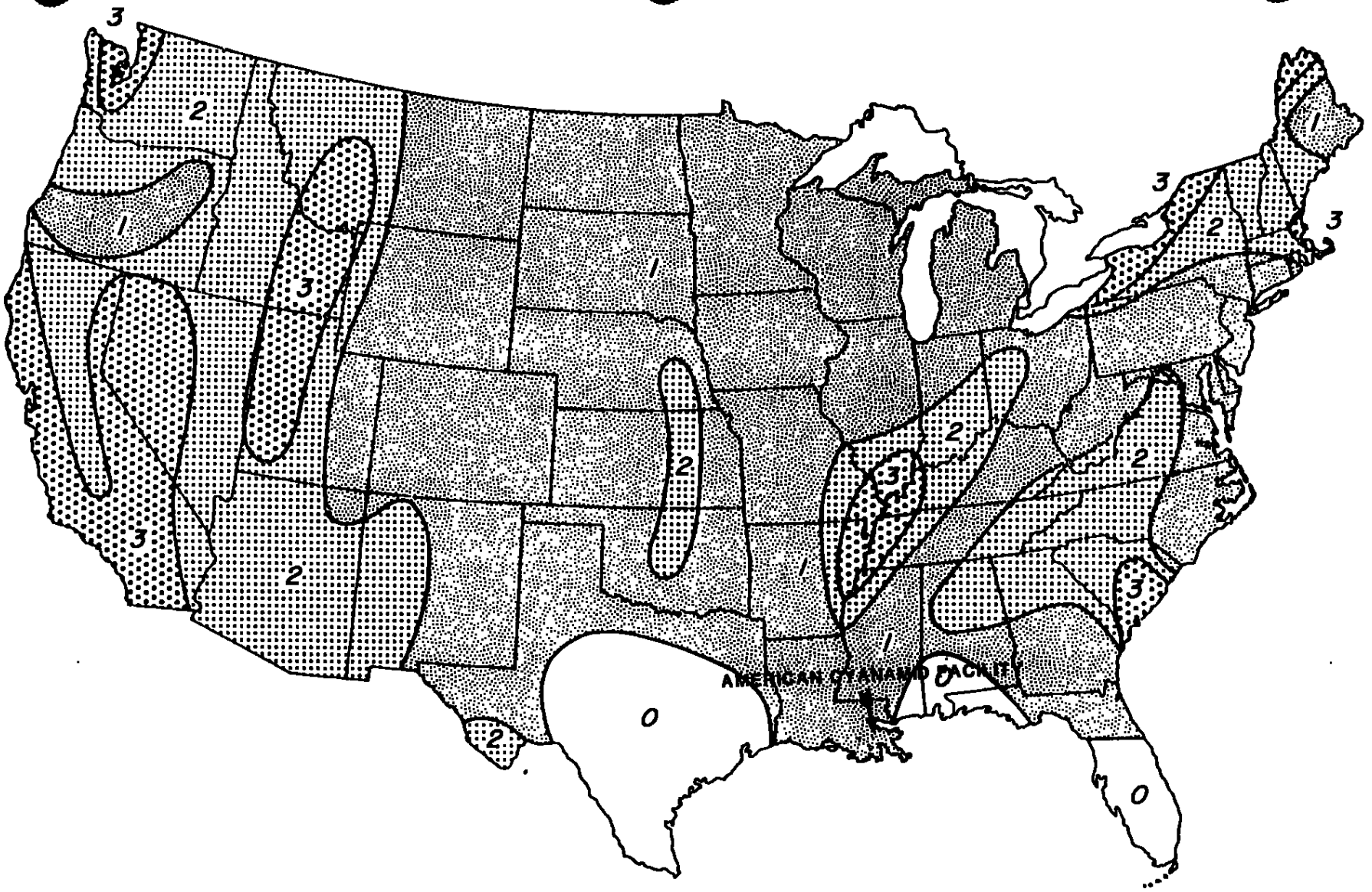
Although the geologic region is a mature oil and gas producing province, hydrocarbon production within the area of review at American Cyanamid's injection facility is confined to older Miocene reservoirs located deep beneath the currently utilized injection zone. Oil and gas fields within seven miles of the plant are the Westwego, Avondale and West Avondale Fields to the south and southeast, Kenner, North Saint Rose, Luling, Good Hope, and East Good Hope Fields to the northwest and north (Figure 5-31). These fields produce hydrocarbons from the Middle and Lower Miocene stratigraphic section deformed into faulted anticlinal structures. The Upper Miocene and Pliocene injection intervals utilized by American Cyanamid have not been productive in nearby fields.

Characteristics of the major fields, Good Hope and Avondale have been described by the New Orleans Geological Society (1983, 1985) and are summarized below.

The Good Hope Field is located approximately 6 miles northwest of the Fortier Plant in T-12-S, R-8-E, in St. Charles Parish. The Good Hope Field "is a highly faulted intermediate depth salt dome (New Orleans Geological Society, 1983, p. 20a)". Salt is encountered at between 9600' and 11,000' in wells on top of the dome. The field has been producing since its discovery in 1944 primarily from the Cibicides opima horizon at approximately 7700' over the crest of the dome.

As of 1983, the Good Hope Field had produced 72.6 MMBBL of oil and condensate and 68.6 BCF of gas. The estimated recoverable reserves are 96.0 MMBBL of oil and 98.7 BCF of gas. (New Orleans Geological Society)

The Avondale Field, discovered in 1949, is located approximately 4.5 miles southeast of the Fortier Plant in T-13-S, R-22-E, in Jefferson Parish. Five producing zones lie between 5430' (Middle Miocene Bigenerina 2) and 8936' (MIddle Miocene Cibicides opima). As of 1965, estimated ultimate reserves were 13 MMBBL and 7.3 BCF. (New Orleans Geological Society, 1985)



Seismic risk map for conterminous United States. Zone 0 – no damage. Zone 1 – minor damage; corresponds to intensities V and VI of the M. M.* scale. Zone 2 – moderate damage; corresponds to intensity VII of the M. M.* scale. Zone 3 – major damage; corresponds to intensity VIII and higher of the M. M.* scale. (* – M. M. refers to the Modified Mercalli Intensity Scale.)

FIGURE 5-29 : SEISMIC RISK MAP for CONTERMINIOUS UNITED STATES (from Jackson, 1979)

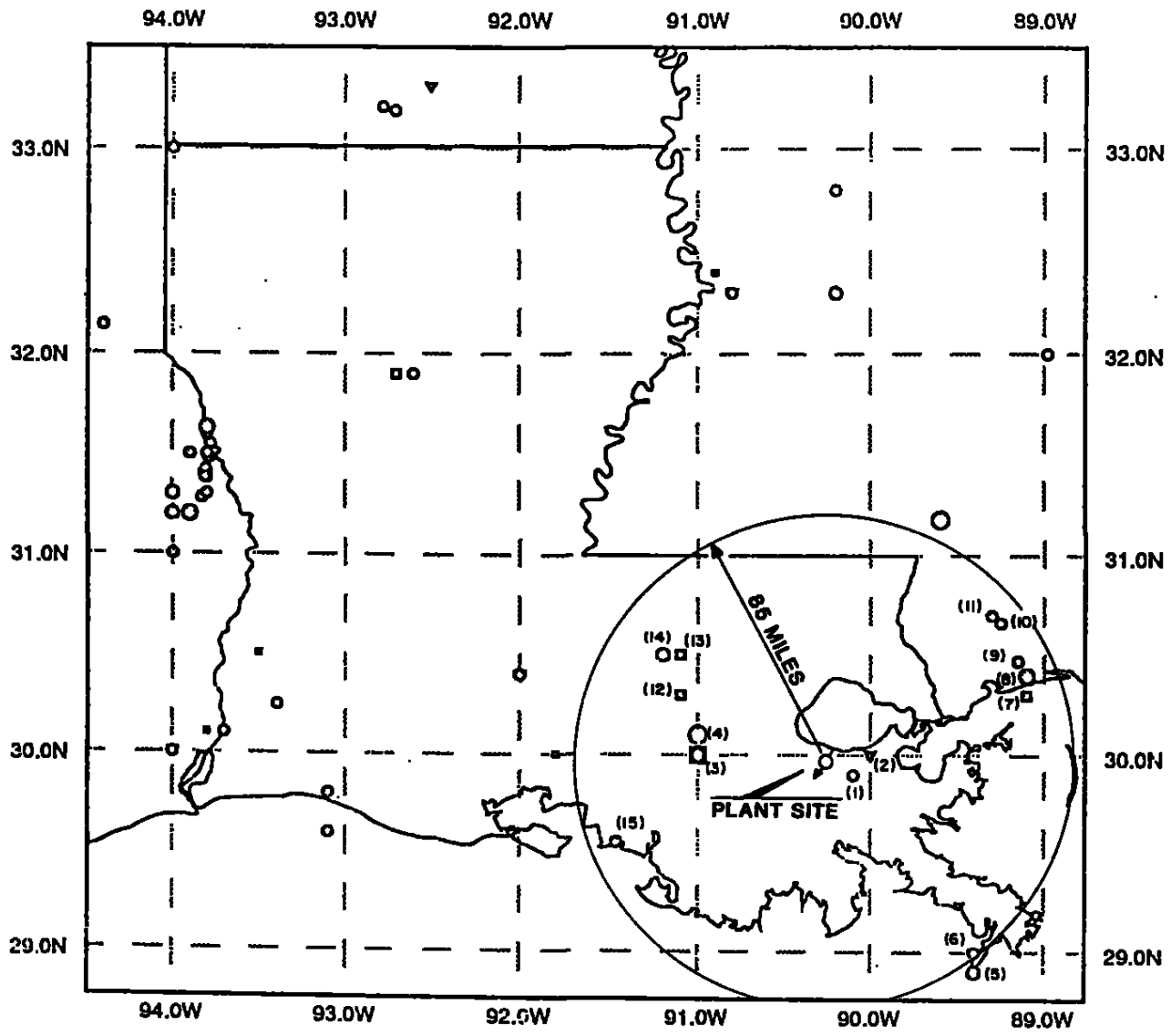
Table 5-E

EARTHQUAKES RECORDED WITHIN 85 MILES OF AMERICAN CYANAMID

ID NO.	DATE	LATITUDE	LONGITUDE	MAGNITUDE (RICHTER)	INTENSITY (MODIFIED MERCALLI SCALE)	DISTANCE FROM SITE (MILES)
1	04/12/1882	29.9 N	90.1 W	3.4	III	10
2	02/14/1843	30 N	90 W	3	III	15
	02/15/1843					
	06/11/1958	30 N	90 W	3.8		
3	10/19/1930	30 N	91 W	4.2	VI	45
4	10/19/1930	30.1 N	92 W	4.7	VI	46
5	12/15/1927	28.9 N	89.4 W	4.2	IV	90
6	12/15/1927	29 N	39.4 W	3.9	IV	84
7	02/01/1955	30.3 N	89.1 W	N/A	V	73
8	02/01/1955	30.4 N	89.1 W	4.4	V	75
9	09/09/1975	30.47 N	89.15 W	2.9	IV	75
10	09/09/1975	30.662 N	89.248 W	2.9	N/A	77
11	09/09/1975	30.7 N	89.3 W	2.9	IV	76
12	11/19/1958	30.3 N	91.1 W	N/A	V	55
13	02/03/1905	30.5 N	91.1 W	N/A	V	62
14	11/19/1958	30.5 N	91.2 W	4.2	V	67
15	02/18/1981	29.56 N	91.46 W	3	N/A	76

N/A = Not Available

SEISMICITY OF LOUISIANA



MAGNITUDES (RICHTER)

<4.0
5.0
6.0
7.0

120 EARTHQUAKES PLOTTED

NO INTENSITY OR MAGNITUDE ▼

INTENSITIES (MODIFIED MERCALLI SCALE)

I-IV
V
VII
IX

NATIONAL GEOPHYSICAL DATA CENTER / NOAA BOULDER, CO 80303

EARTHQUAKES WITHIN 85 MILES OF AMERICAN CYANAMID FORTIER PLANT

FIGURE 5-30

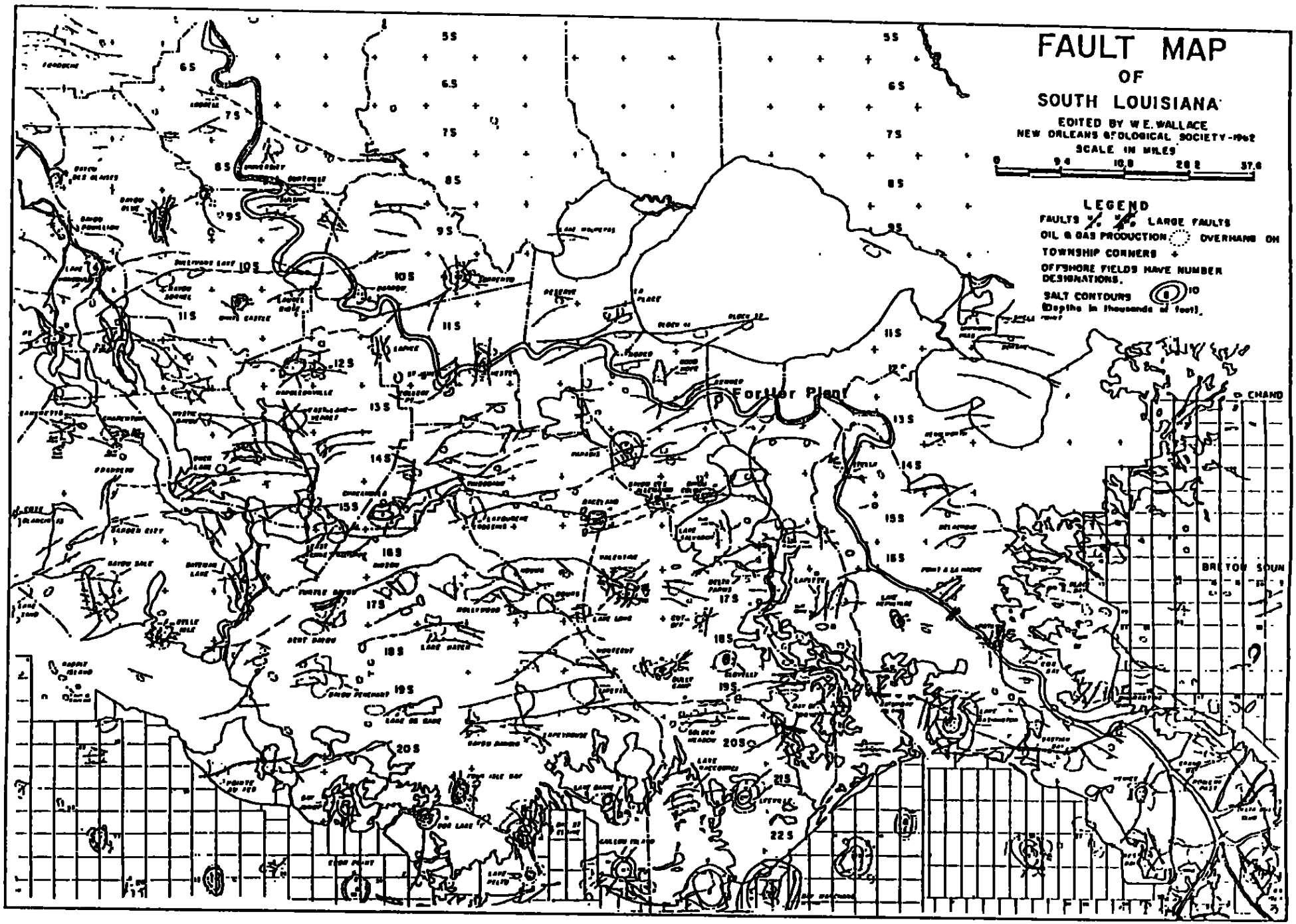

FAULT MAP
OF
SOUTH LOUISIANA
EDITED BY W.E. WALLACE
NEW ORLEANS GEOLOGICAL SOCIETY-1962
SCALE IN MILES
0
9.4
18.8
28.2
37.6
LEGEND
FAULTS
LARGE FAULTS
OIL & GAS PRODUCTION
OVERHANG ON
TOWNSHIP CORNERS
OFFSHORE FIELDS HAVE NUMBER DESIGNATIONS.
SALT CONTOURS
(Depths in thousands of feet).
P. Fortier Plant
BRETON SOUN

FIGURE 5-3

Appendix Z

LAC 33:V.517.T.3.a.

Geological Certification

ARCADIS GERAGHTY & MILLER

ARCADIS Geraghty & Miller, Inc.
2900 West Fork Drive, Suite 540
Baton Rouge
Louisiana 70827
Tel 504 292 1004
Fax 504 292 5210

ENVIRONMENTAL

Ms. Stacey Foret
Environmental Engineer
Cytec Industries, Inc.
10800 River Road
Westwego, Louisiana 70094

Subject:
Geological Certification
Fortier Plant

Baton Rouge,
26 May 1998

Contact:
George H. Cramer

Extension:
(504) 292-1004

Dear Ms. Foret:

ARCADIS Geraghty & Miller, Inc., (ARCADIS Geraghty & Miller) a nationally recognized hydrogeological consulting firm, has reviewed geological borings, cross-sections, published geological data and various similar data on subsurface conditions at the Cytec Industries, Inc. Fortier, Louisiana Plant. ARCADIS Geraghty & Miller believes that, assuming proper engineering practices are followed, the subsurface geological conditions at the Fortier Plant site are suitable for continued use as a chemical plant with associated treatment, storage, and disposal facilities for hazardous waste generated by the plant. The Fortier Plant has maintained hazardous waste treatment, storage and disposal facilities at this facility for the past 42 years.

This Geological Certification is provided herein in accordance with the requirements of the Louisiana Hazardous Waste Regulations as cited in LAC 33:V.517.T.3.a.

Sincerely,

ARCADIS Geraghty & Miller, Inc.

George H. Cramer, II, P.G.
Principal Hydrogeologist
Arkansas License No. 604
GHC:dsj

000050LA.0000
98Prop/108

Appendix AA

LAC 33:V.517.T.3.b.

Generalized Hydrogeologic Column

GENERALIZED HYDROGEOLOGIC COLUMN

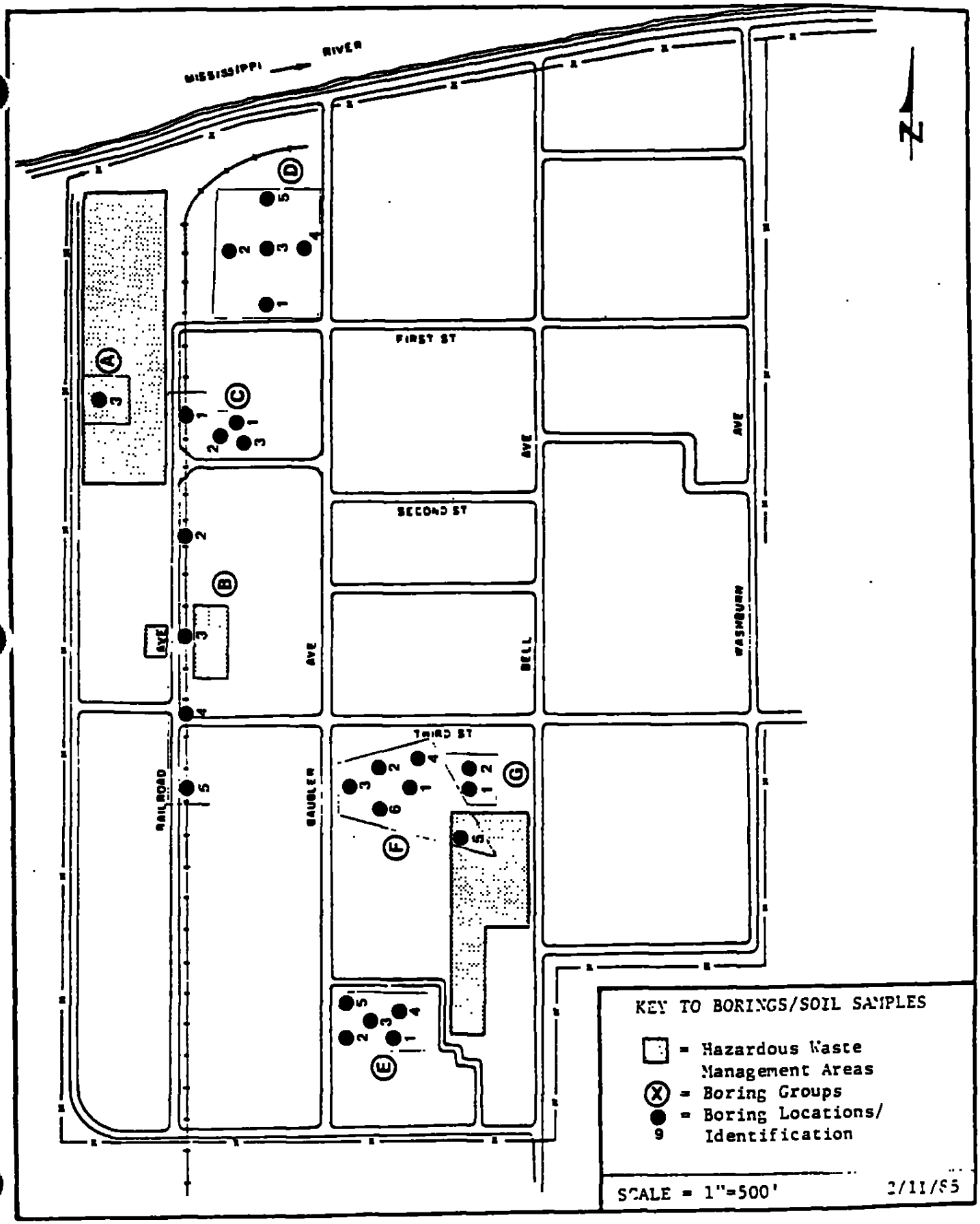
Mean Sea Level (Feet)	Series	Aquifer	Characteristics
0	Recent	Shallow Aquifer	Marsh, swamp, marine, and brackish water deposits. Abandoned channel deposits, point bar deposits of the Mississippi River.
-160			
	Pleistocene	Gramercy	Deltaic deposits of clay, sand, and gravel. Water in the Gramercy Aquifer is essentially fresh. In the Norco Aquifer, depending on location, wells may produce either fresh or slightly salt water. The water in the Gonzales-New Orleans aquifer is generally salty.
-260			
-300		Norco	
-450			
-650		Gonzales-New Orleans	
-850			
-1200			
	Pliocene		Medium to fine-grained deltaic sand, clay and silt.
-2000			
	Miocene		Deltaic deposits of fine to medium-grained sand, silt, and clay.
-15,000			

Appendix BB

LAC 33:V.517.T.3.d.

Soil Boring Logs and Soil Characteristics

Key to Borings/Soil Samples


MISSISSIPPI RIVER
N
FIRST ST
SECOND ST
THIRD ST
AVE
BELL
WASHBURN
RAILROAD
GAUBLER
A
B
C
D
E
F
G
KEY TO BORINGS/SOIL SAMPLES
= Hazardous Waste Management Areas
= Boring Groups
= Boring Locations/ Identification
9
SCALE = 1"=500'
2/11/85

Boring Group A

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.

LOG OF BORING

Name of Project: American Cyanamid Company - Ammonia Offsites
Fortier Plant, Avondale, Louisiana
For: American Cyanamid Company, Wayne, New Jersey

Boring No. 3 Soil Technician A. J. Maveux Date 25 March 1977
Ground Elev. _____ Datum _____ Gr. Water Depth See Text

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST
			0.0	1.5	Compact shells & sand	
1	2.5	3.0	1.5	4.5	Soft gray clay w/trace of silt	
2	5.5	6.0	4.5	6.5	Soft tan & gray clay	
3	8.5	9.0	6.5		Very soft gray & tan silty clay	
4	11.5	12.0		12.0	Ditto	
5	14.5	15.0	12.0	15.0	Soft gray & tan silty clay w/trace of sand	
6	19.5	20.0	15.0	22.0	Soft gray clay	
7	24.5	25.0	22.0	26.5	Loose gray sandy silt w/clayey silt & silty clay layers	
8	29.5	30.0	26.5	32.0	Soft gray clay w/sandy silt lenses & layers	
9	34.5	35.0	32.0	37.0	Medium stiff gray clay w/clayey silt layers	
10	39.5	40.0	37.0	42.0	Medium compact gray sandy silt w/trace of clay	
11	44.5	45.0	42.0	46.0	Medium stiff gray clay w/silt lenses	
12	49.5	50.0	46.0	50.0	Stiff gray clay w/silt lenses	

DEPTH IN FT

*Number in first column indicates number of blows of 140 lb hammer dropped 30 in required to seat 2-in O D splitspoon sampler 6 in Number in second column indicates number of blows of 140-lb hammer dropped 30 in required to drive 2-in. O D splitspoon sampler 1 ft. after seating 6 in.

WHILE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN, IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

CLAY SILT SAND HUMUS

Remarks: Boring Coordinates:

E-1000: E-55

Subsoil Investigation
American Cyanamid Company
Ammonia Offsites
Fortier Plant
Avondale, Louisiana

For: American Cyanamid Company, Wayne, New Jersey

SUMMARY OF LABORATORY TEST RESULTS

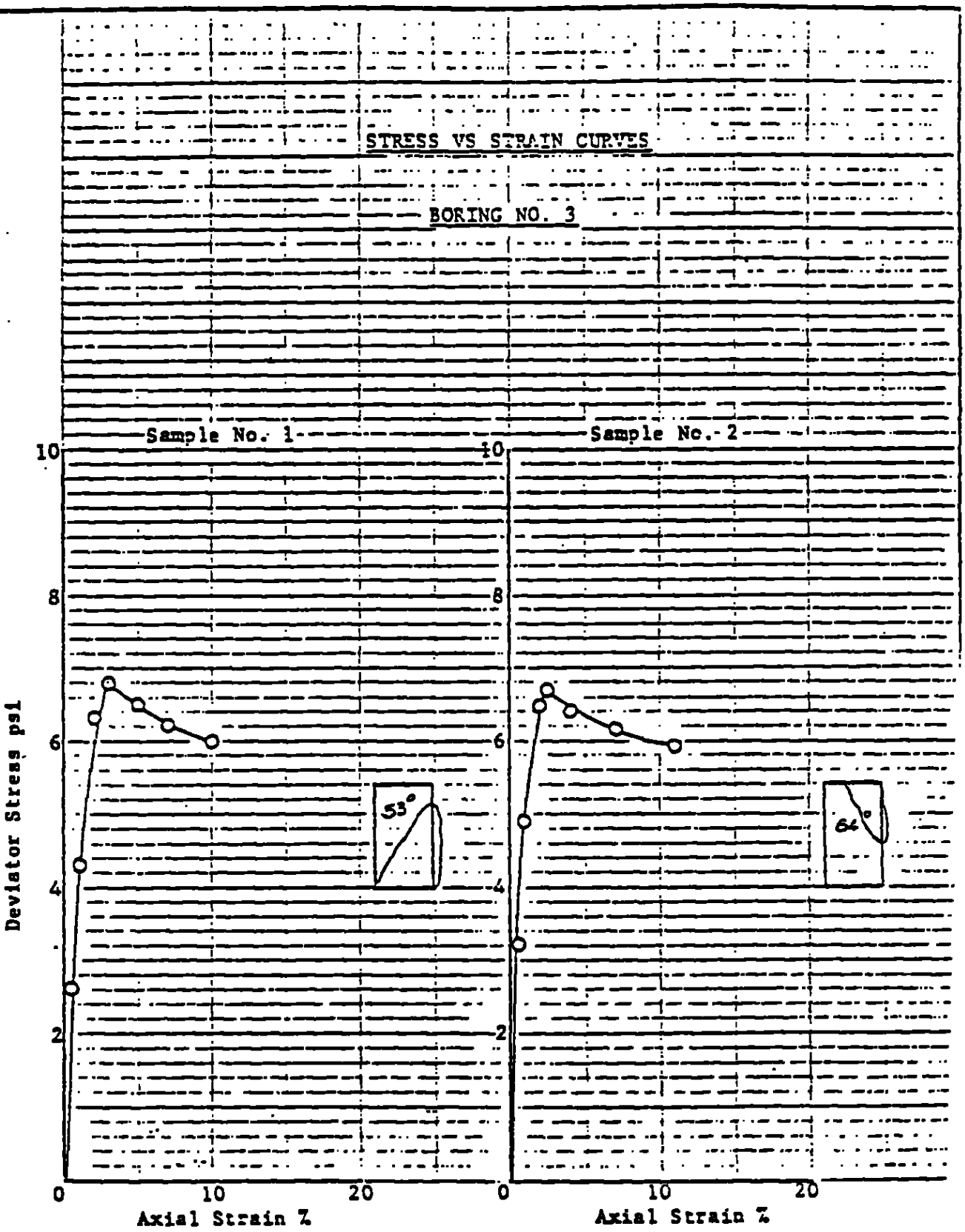
BORING 3

Sample No.	Depth in Feet	Classification	Water Content Percent	Density Lb/cu ft Dry	Density Lb/cu ft Wet	Unconfined Compressive Strength Lb/sq ft
1	2.5	Medium stiff gray clay w/trace of silt	42.1	77.9	110.5	975*
2	5.5	Soft tan & gray clay w/trace of silt	37.7	81.7	112.5	965*
3	8.5	Very soft tan & gray silty clay	36.1	84.5	114.9	415*
4	11.5	Very soft tan & gray silty clay w/clayey silt layers	34.2	88.0	118.1	430*
5	14.5	Soft gray & tan silty clay w/trace of sand	33.8	88.3	118.2	635*
6	19.5	Soft gray clay w/clayey silt lenses	42.0	79.6	113.1	765*
7	24.5	Loose gray sandy silt w/clay & clayey silt layers	34.8	86.0	115.9	785*
8	29.5	Soft gray clay w/sandy silt lenses	58.7	66.4	102.2	560*
9	34.5	Medium stiff gray clay w/clayey silt layers	38.5	82.0	113.5	1425*
10	39.5	Medium compact gray sandy silt w/trace of clay	31.8	93.9	123.8	$\phi=19^{\circ}$ c=575**
11	44.5	Medium stiff gray clay w/many silt lenses	44.3	77.0	111.1	1075*
12	49.5	Stiff gray clay	61.4	64.6	104.2	2080*

*Unconsolidated-Undrained Triaxial Compression Test - One Specimen. Confined at the approximate overburden pressure.

**Unconsolidated-Undrained Triaxial Compression Test - Multiple Stage.
ϕ = Angle of internal friction;
c = Cohesion in lb per sq ft.

Fig. 6

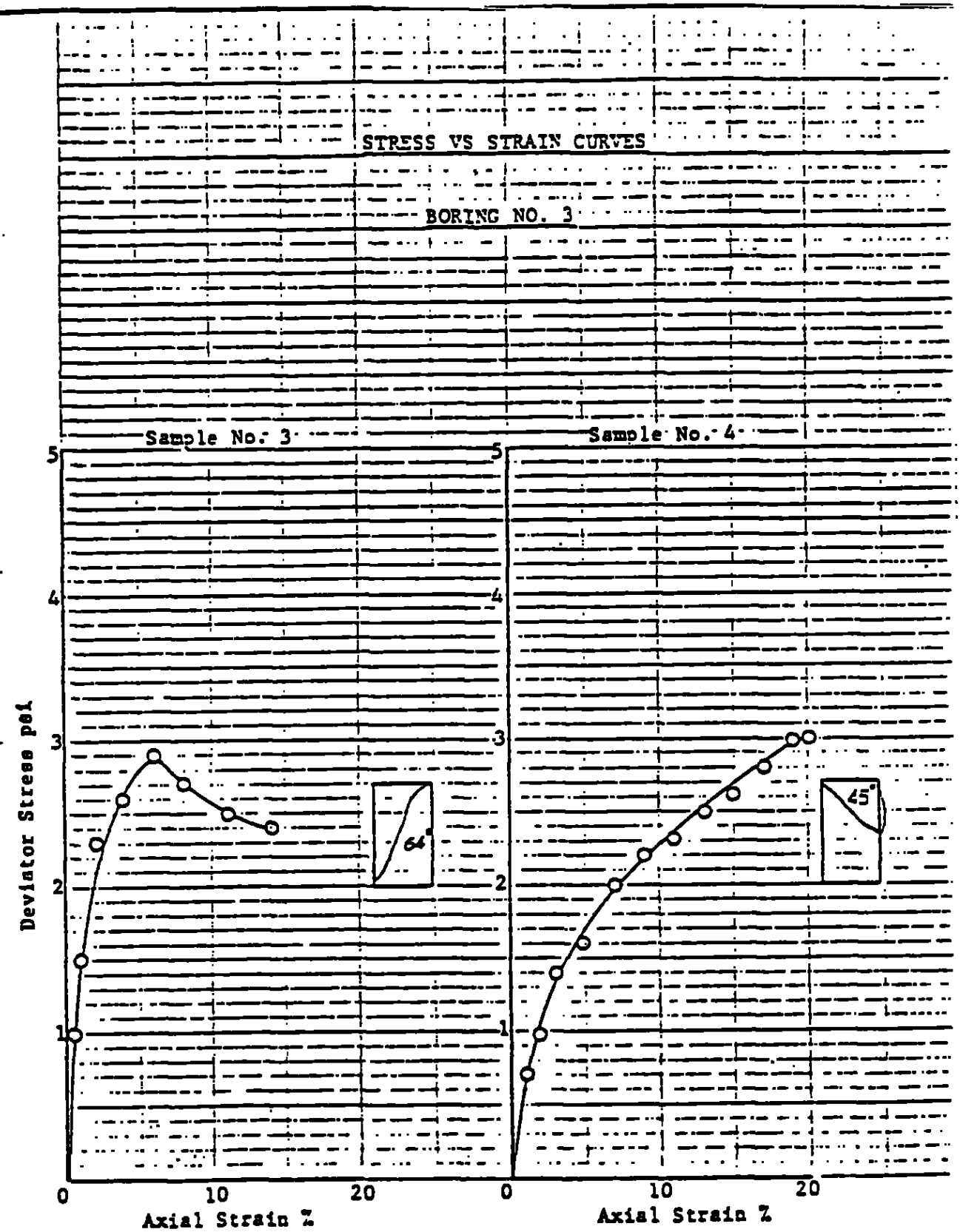


UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TESTS

Subsoil Investigation
American Cyanamid Company - Ammonia Offsites
Fortier Plant, Avondale, Louisiana

For: American Cyanamid Company, Wayne, New Jersey

Fig.

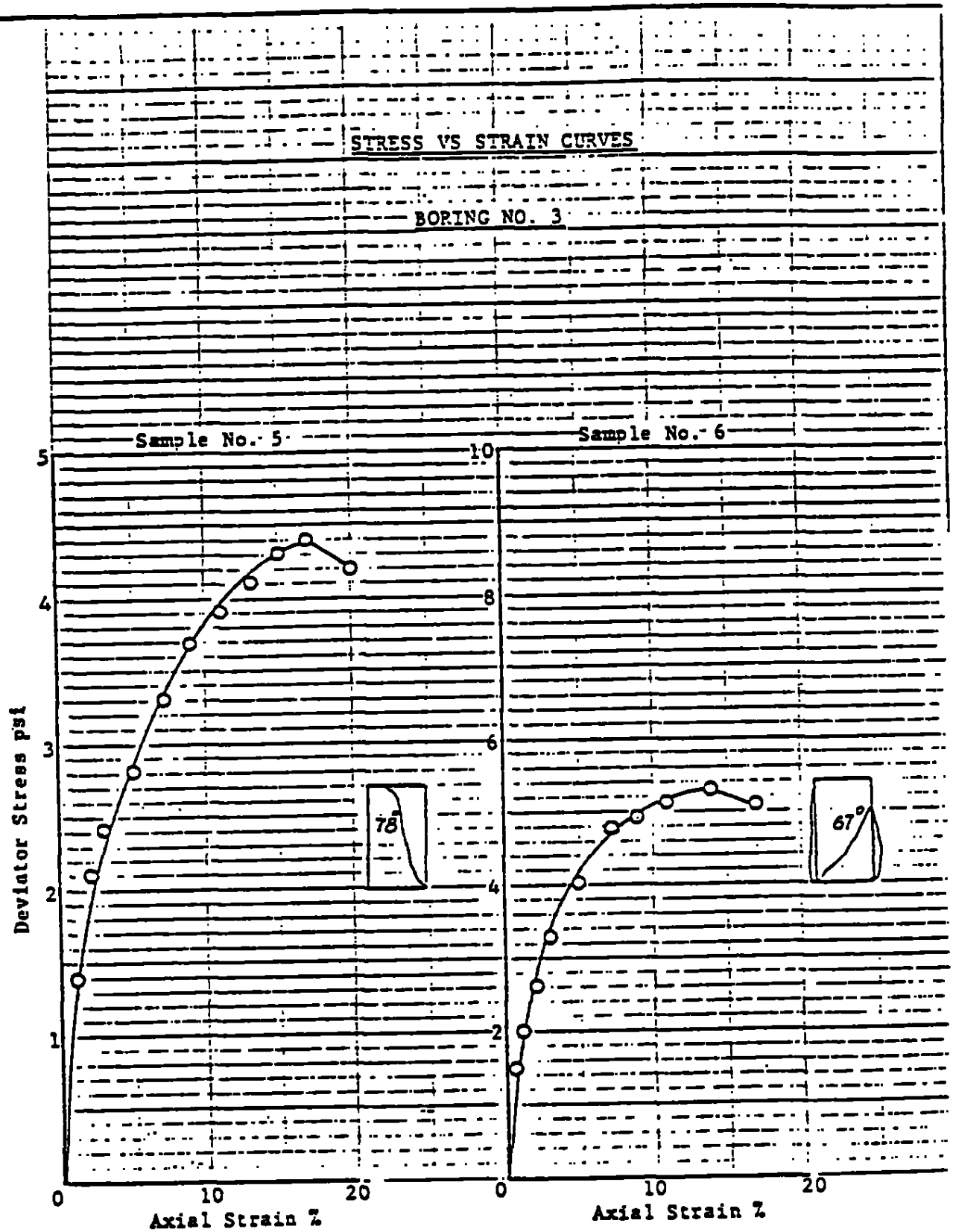


UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TESTS

Subsoil Investigation
American Cyanamid Company - Ammonia Offsites
Fortier-Plant, Avondale, Louisiana

For: American Cyanamid Company, Wayne, New Jersey

Fig. 8

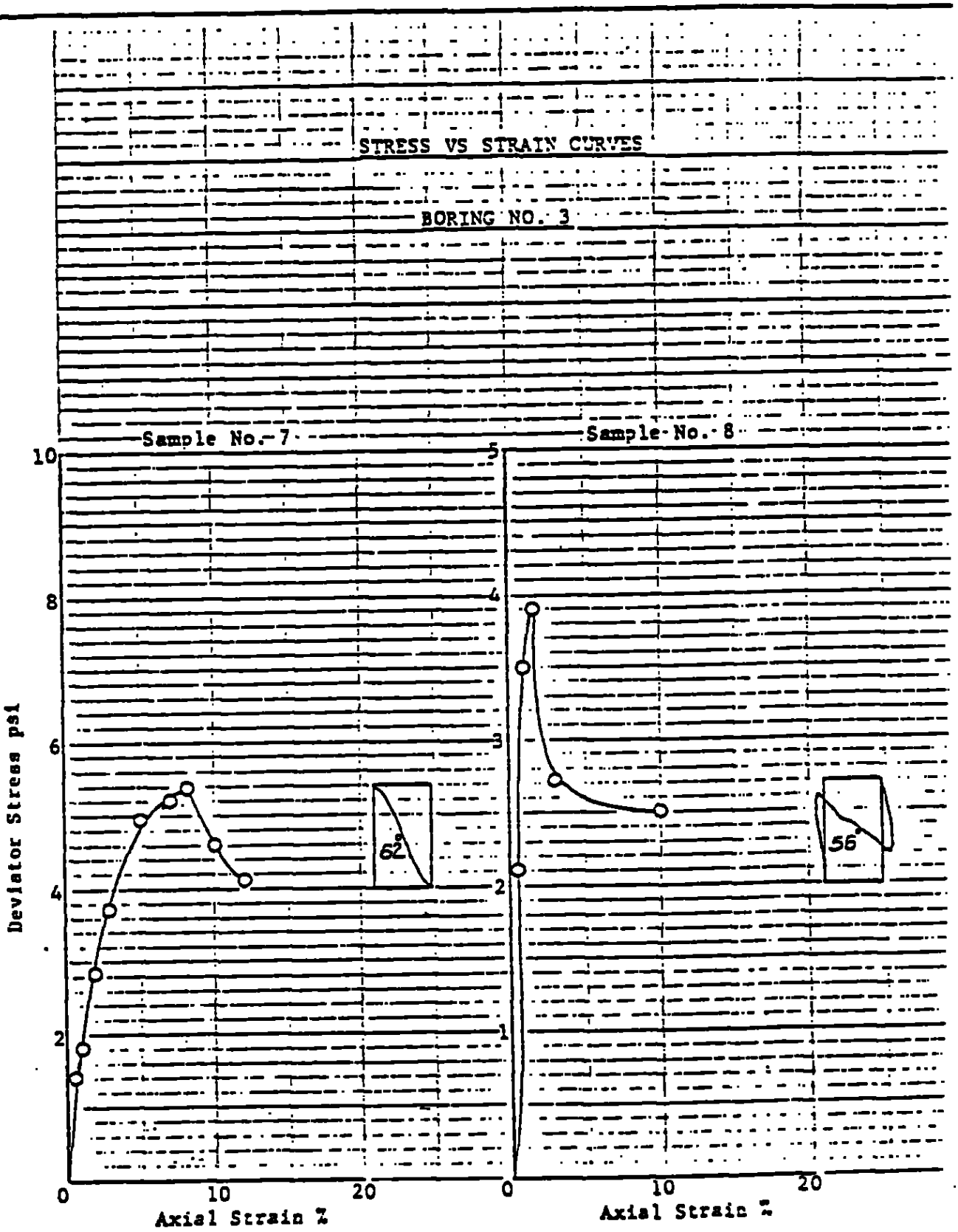


UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TESTS

Subsoil Investigation
American Cyanamid Company - Ammonia Offsites
Fortier Plant, Avondale, Louisiana

For: American Cyanamid Company, Wayne, New Jersey

Fig. 9



UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TESTS

Subsoil Investigation
American Cyanamid Company - Ammonia Offsites
Fortier Plant, Avondale, Louisiana

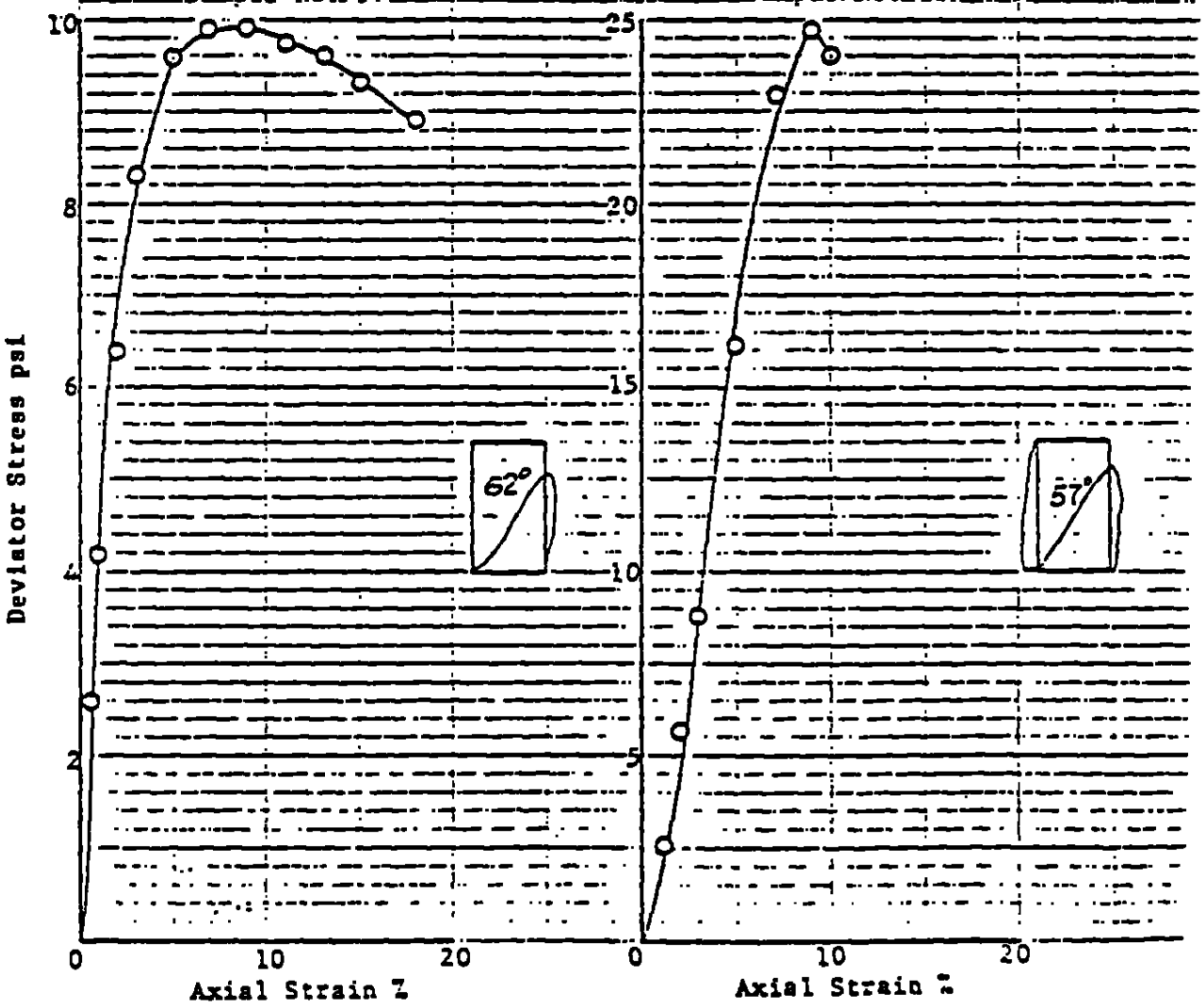
For: American Cyanamid Company, Wayne, New Jersey

Fig.

EUSTIS ENGINEERING COMPAN

STRESS VS STRAIN CURVES

BORING NO. 3

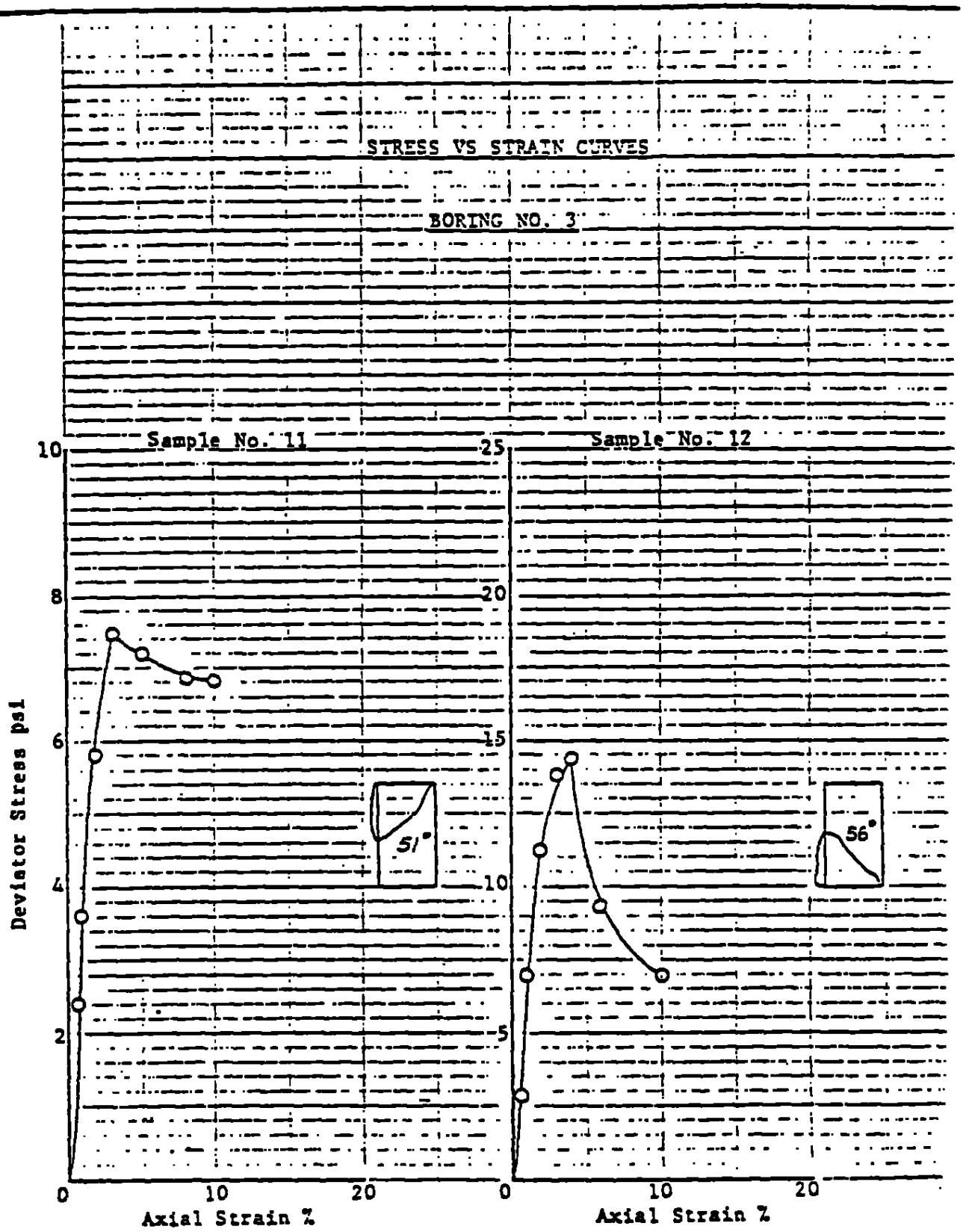


UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TESTS

Subsoil Investigation
American Cyanamid Company - Ammonia Offsites
Fortier Plant, Avondale, Louisiana

For: American Cyanamid Company, Wayne, New Jersey

Fig.



UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TESTS

Subsoil Investigation
American Cyanamid Company - Ammonia Offsites
Fortier Plant, Avondale, Louisiana

For: American Cyanamid Company, Wayne, New Jersey

Fig. 1

Boring Group B

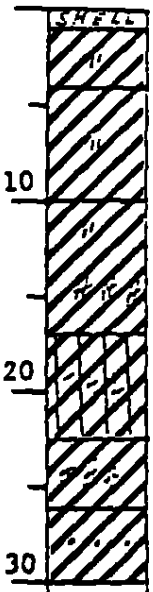
EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE LA.

LOG OF BORING

Name of Project: American Cyanamid Company - Existing Railroad Tracks
Fortier Plant, Jefferson Parish, Louisiana
For: American Cyanamid Company, Westwego, Louisiana

Boring No. 1 Soil Technician George Pratt Date 8 May 1979
Ground Elev. _____ Datum _____ Gr. Water Depth See Text

Sample no.	Sample Depth — Feet From	Sample Depth — Feet To	Depth Stratum Feet From	Depth Stratum Feet To	Visual Classification	*Standard Penetration Test	
			0.0	1.0	Shell fill		
1	2.0	2.5	1.0	4.0	Medium stiff gray & tan clay w/silt pockets		
2	5.0	5.5	4.0		Soft gray & tan clay w/silt pockets		
3	8.0	8.5		10.0	Ditto		
4	11.0	11.5	10.0		Medium stiff gray clay w/silt pockets & clayey silt layers		
5	14.0	14.5		17.0	Ditto		
6	19.0	19.5	17.0	22.5	Soft gray silty clay w/clayey silt layers		
7	24.0	24.5	22.5	26.0	Soft gray clay w/clayey silt layers		
8	29.0	29.5	26.0	30.0	Soft gray clay w/sand lenses		



*Number in first column indicates number of blows of 140-lb hammer dropped 30 in required to seat 2-in O D splitspoon sampler 6 in Number in third column indicates number of blows of 140-lb hammer dropped 30 in required to drive 2-in O D splitspoon sampler 1 ft after seating 6 in

WHILE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN, IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

Remarks: _____

CLAY SILT SAND HUMUS

Predominant type shown heavy Modifying type shown light.

Fig.

Subsoil Investigation
American Cyanamid Company
Existing Railroad Tracks
Fortier Plant
Jefferson Parish, Louisiana

For: American Cyanamid Company, Westwego, Louisiana

SUMMARY OF LABORATORY TEST RESULTS

BORING 1

Sample No.	Depth in Feet	Classification	Water Content Percent	Density Lb/cu ft Dry	Density Lb/cu ft Wet	Unconfined Compressive Strength Lb/sq ft	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI
1	2.0	Medium stiff gray & tan clay w/silt pockets	32.4	91.3	120.9	1685	80	23	57
2	5.0	Soft gray & tan clay w/silt pockets	44.4	77.2	111.5	885			
3	8.0	Soft gray & tan fissured clay	41.7	78.2	110.8	770			
4	11.0	Medium stiff gray clay	48.4	72.7	107.9	1130			
5	14.0	Ditto	51.1	70.5	106.5	1250			
6	19.0	Soft gray silty clay w/clay & clayey silt layers	35.7	85.4	115.9	790*			
7	24.0	Soft gray clay w/clayey silt layers	40.1	81.2	113.7	925	47	22	25
8	29.0	Soft gray fissured clay w/sand lenses	54.1	67.0	103.2	805			

*Unconsolidated-Undrained Triaxial Compression Test - One Specimen. Confined at the approximate overburden pressure.

Fig. 12

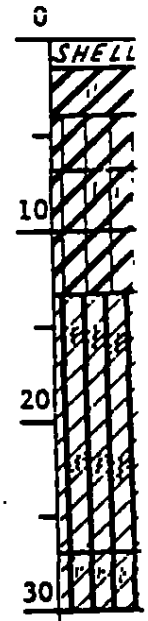
EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA

LOG OF BORING

Name of Project: American Cyanamid Company - Existing Railroad Tracks
Fortier Plant, Jefferson Parish, Louisiana
For: American Cyanamid Company, Westwego, Louisiana

Boring No. 2 Soil Technician George Pratt Date 8 May 1979
Ground Elev. _____ Datum _____ Gr. Water Depth See Text

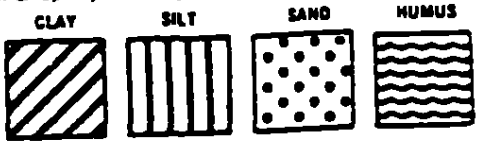
Sample no.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
1	1.0	1.5	0.0	1.5	Shell fill		
2	2.5	3.0	1.5	4.0	Stiff gray & tan clay w/silt pockets		
3	5.0	5.5	4.0	7.0	Medium stiff gray & tan silty clay		
4	8.0	8.5	7.0	10.0	Soft gray & tan silty clay w/silt		
					lenses		
5	11.0	11.5	10.0	13.5	Soft gray silty clay		
6	14.0	14.5	13.5		Medium compact gray clayey silt with		
					silty clay layers		
7	19.0	19.5			Ditto		
8	24.0	24.5		27.0	Ditto		
9	29.0	29.5	27.0	30.0	Loose gray clayey silt w/silty sand		
					layers		



mber in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in O. D splitspoon sampler 6 in. Number in
nd column indicates number of blows of 140-lb hammer dropped 30 in required to drive 2-in O. D splitspoon sampler 1 ft after seating 6 in

BLE THIS LOG OF BORING is CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CON-
IONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN. IT IS NOT WARRANTED THAT
E REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

Remarks: _____



Predominant type shown heavy Modifying type shown light.

Fig

Subsoil Investigation
American Cyanamid Company
Existing Railroad Tracks
Fortier Plant
Jefferson Parish, Louisiana

For: American Cyanamid Company, Westwego, Louisiana

SUMMARY OF LABORATORY TEST RESULTS

BORING 2

Sample No.	Depth in Feet	Classification	Water Content Percent	Density Lb/cu ft Dry	Density Lb/cu ft Wet	Unconfined Compressive Strength Lb/sq ft
2	2.5	Stiff gray & tan clay w/silt pockets	32.3	89.3	118.2	2635
3	5.0	Medium stiff gray & tan silty clay	29.3	92.2	119.3	1915
4	8.0	Soft gray & tan silty clay w/silt lenses	34.0	86.4	115.7	995
5	11.0	Soft gray silty clay	34.2	87.8	117.8	840*
7	19.0	Medium compact gray clayey silt w/silty clay layers	36.0	84.6	115.1	1755*
9	29.0	Loose gray clayey silt w/silty sand layers	34.5	86.6	116.5	630*

BORING 3

1	2.5	Soft gray & tan clay w/silt pockets	40.7	80.6	113.4	805
2	5.0	Soft gray & tan silty clay	32.8	90.0	119.5	910
3	8.0	Medium stiff gray & tan silty clay	35.7	85.7	116.3	1120
4	11.0	Loose gray clayey silt	32.7	91.5	121.5	----
5	14.0	Ditto	32.1	91.0	120.1	815*
6	19.0	Soft gray clay w/clayey silt layers	46.3	74.0	108.3	705
7	24.0	Soft gray clay w/silt lenses	64.1	60.1	98.6	785

*Unconsolidated-Undrained Triaxial Compression Test - One Specimen. Confined at the approximate overburden pressure.

Fig. 13

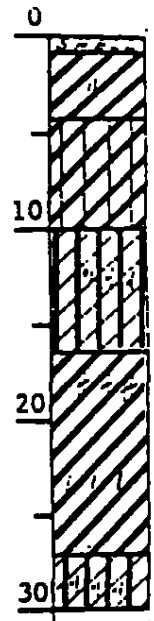
EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE LA

LOG OF BORING

Name of Project: American Cyanamid Company - Existing Railroad Tracks
Fortier Plant, Jefferson Parish, Louisiana
For: American Cyanamid Company, Westwego, Louisiana

Boring No. 3 Soil Technician George Pratt Date 8 May 1979
Ground Elev. _____ Datum _____ Gr. Water Depth See Text

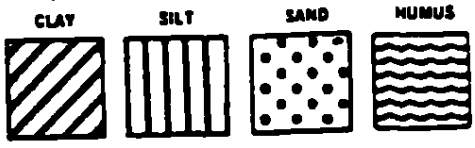
Sample no.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
			0.0	1.0	Shell fill		
1	2.5	3.0	1.0	4.5	Soft gray & tan clay w/silt pockets		
2	5.0	5.5	4.5		Soft to medium stiff gray & tan silty clay		
3	8.0	8.5		10.0	Ditto		
4	11.0	11.5	10.0		Loose gray clayey silt w/sandy silt layers		
5	14.0	14.5		16.5	Ditto		
6	19.0	19.5	16.5		Soft gray clay w/clayey silt layers		
7	24.0	24.5		27.0	Soft gray clay w/silt lenses		
8	29.0	29.5	27.0	30.0	Loose gray clayey silt w/sandy silt layers		



*Number in first column indicates number of blows of 140-lb hammer dropped 30 in. required to seat 2-in O. D splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb hammer dropped 30 in required to drive 2-in O D splitspoon sampler 1 ft after seating 6 in

WHILE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN, IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

Remarks: _____



Predominant type shown heavy Modifying type shown light.

Fig.

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.

LOG OF BORING

Name of Project: American Cyanamid Company - Existing Railroad Tracks
Fortier Plant, Jefferson Parish, Louisiana
For: American Cyanamid Company, Westwego, Louisiana

Boring No. 4 Soil Technician George Pratt Date 7 May 1979
Ground Elev. _____ Datum _____ Gr. Water Depth See Text

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
1	2.0	2.5	0.0	2.5	Shell fill		
2	5.0	5.5	2.5	7.0	Medium stiff gray & tan clay w/silt pockets		
3	8.0	8.5	7.0	10.0	Very soft gray & tan silty clay		
4	11.0	11.5	10.0	13.0	Medium compact gray clayey silt w/silty clay layers		
5	14.0	14.5	13.0	17.0	Soft gray clay w/clayey silt layers		
6	19.0	19.5	17.0	22.5	Medium compact gray clayey silt with sandy silt layers		
7	24.0	24.5	22.5	27.0	Loose gray sandy silt w/clayey silt layers		
8	29.0	29.5	27.0	30.0	Medium stiff gray clay w/silt lenses		

DEPTH IN FT

SHELL
10
20
30

*Number in first column indicates number of blows of 140-lb hammer dropped 30 in required to seat 2-in O D splitspoon sampler 6 in Number in second column indicates number of blows of 140-lb hammer dropped 30 in required to drive 2-in. O. D. splitspoon sampler 1 ft after seating 6 in

WHILE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN, IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

CLAY SILT SAND HUMUS

Predominant type shown heavy. Modifying type shown light.

Remarks: _____

Fig.

Subsoil Investigation
American Cyanamid Company
Existing Railroad Tracks
Fortier Plant
Jefferson Parish, Louisiana

For: American Cyanamid Company, Westwego, Louisiana

SUMMARY OF LABORATORY TEST RESULTS

BORING 4

Sample No.	Depth in Feet	Classification	Water Content Percent	Density Lb/cu ft Dry	Density Lb/cu ft Wet	Unconfined Compressive Strength Lb/sq ft	Atterberg Limits LL	PL	PI
2	5.0	Medium stiff gray & tan clay w/silt pockets	33.6	87.9	117.4	1880			
3	8.0	Very soft gray & tan silty clay	35.7	85.6	116.2	470*	40	23	17
4	11.0	Medium compact gray clayey silt	35.5	86.9	117.7	1130*			
5	14.0	Soft gray clay w/silt lenses	52.5	70.0	106.8	525			
6	19.0	Medium compact gray clayey silt w/sandy silt layers	36.9	83.8	114.7	970*			
8	29.0	Medium stiff gray clay w/silt lenses	53.3	68.5	105.0	1120			

BORING 5

2	5.0	Medium stiff gray & tan clay	41.3	79.9	113.0	1025			
3	8.0	Stiff gray & tan clay w/silt pockets	33.5	87.5	116.8	2630			
5	14.0	Medium stiff gray clay w/clayey silt layers	38.5	82.8	114.7	1005*			
6	19.0	Soft gray clay w/clayey silt layers	54.3	68.6	105.8	905			
7	24.0	Ditto	63.4	61.5	100.4	825			
8	29.0	Ditto	49.9	71.5	107.2	980			

*Unconsolidated-Undrained Triaxial Compression Test - One Specimen. Confined at the approximate overburden pressure.

Fig. 14

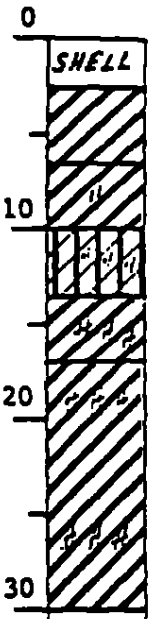
EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.

LOG OF BORING

Name of Project: American Cyanamid Company - Existing Railroad Tracks
Fortier Plant, Jefferson Parish, Louisiana
For: American Cyanamid Company, Westwego, Louisiana

Boring No. 5 Soil Technician George Pratt Date 7 May 1979
Ground Elev. _____ Datum _____ Gr. Water Depth See Text

Sample No.	SAMPLE Depth — Feet From	SAMPLE Depth — Feet To	DEPTH STRATUM Feet From	DEPTH STRATUM Feet To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST
			0.0	2.5	Shell fill	
1	2.5	3.0	2.5		Medium stiff gray & tan clay	
2	5.0	5.5		6.5	Ditto	
3	8.0	8.5	6.5	10.0	Stiff gray & tan clay w/silt pockets	
4	11.0	11.5	10.0	13.5	Loose gray clayey silt w/sandy silt layers	
5	14.0	14.5	13.5	17.0	Medium stiff gray clay w/clayey silt layers	
6	19.0	19.5	17.0		Soft gray clay w/clayey silt layers	
7	24.0	24.5			Ditto	
8	29.0	29.5		30.0	Ditto	



*Number in first column indicates number of blows of 140-lb hammer dropped 30 in required to seat 2-in O D splitspoon sampler 6 in Number in second column indicates number of blows of 140-lb hammer dropped 30 in required to drive 2-in O. D splitspoon sampler 1 ft after seating 6 in

WHILE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN, IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES

Remarks: _____

CLAY SILT SAND HUMUS

Predominant type shown heavy. Modifying type shown light.

Fig.

Boring Group C

EUSTIS ENGINEERING COMPANY
CONSULTING FOUNDATION ENGINEERS
NEW ORLEANS, LA

LOG OF BORING

Name of Project: Proposed Ammonia Storage Tank - American Cyanamid Company
Fortier Plant, Vicinity of New Orleans, Louisiana
For: Chicago Bridge & Iron Company, Houston, Texas

Boring No. 1 Field Engineer A. J. Mayeux Date 9 September 1961

Ground Elev. _____ Datum _____ Gr. Water _____

Sample No.	Sample From	Sample To	Depth Stratum From	Depth Stratum To	Visual Classification	Blows Per Foot
1	2.5	3.0	0.0	3.0	Stiff tan & gray clay	
2	5.5	6.0	3.0	7.5	Medium stiff tan & gray clay	
3	8.5	9.0	7.5	10.0	Medium stiff tan & gray silty clay	
4	11.5	12.0	10.0	14.0	Very soft tan & gray silty clay	
5	14.5	15.0	14.0	17.5	Soft gray silty clay	
6	19.5	20.0	17.5	21.0	Very Soft gray silty clay	
7	24.5	25.0	21.0	26.5	Soft gray clay w/silt layers	
			26.5	27.5	Wood	
8	29.5	30.0	27.5		Soft gray silty clay w/some organic matter	
9	34.5	35.0		36.0	Ditto	
10	39.5	40.0	36.0	41.0	Soft gray clay w/sandy silt layers	
11	44.5	45.0	41.0	47.0	Soft gray clay w/silty sand layers	3
12	47.0	48.5	47.0	50.0	Loose gray silty sand w/clay layers	10
13	50.0	51.5	50.0		Medium dense gray silty sand	7
					w/clay lenses	10 - 25
14	53.5	55.0			Ditto	11 - 29
16	58.5	60.0		63.5	Ditto	12 - 25
17	63.5	65.0	63.5	65.5	Dense gray silty sand	20=0.6'
18	68.5	70.0	68.5	71.0	Very dense gray silty sand	30=0.5'
19	73.5	75.0	71.0		Dense gray silty sand	30=0.6'
20	78.5	80.0			Ditto	30=0.7'
21	83.5	85.0			Ditto	30=0.8'
22	88.5	90.0			Ditto	32
23	93.5	95.0		96.0	Ditto	30=0.9'
24	98.5	100.0	96.0	100.0	Very dense gray fine sand	30=0.5'

Boring coordinates: S1190 - E-634

NOTE:
First number in column headed "Blows per Foot" indicate the number of blows required to seat splitspoon sampler first 6 inches

CLAY SILT SAND

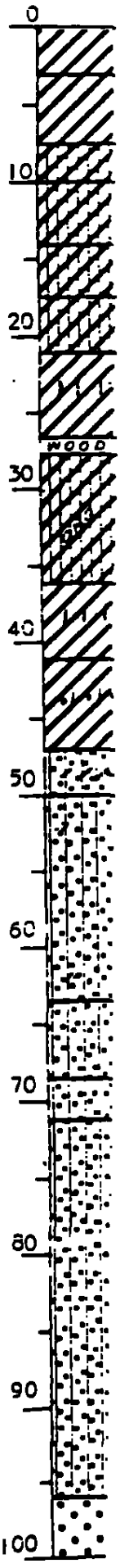


Fig. 2

Subsoil Investigation
Proposed Ammonia Storage Tank
American Cyanamid Company, Fortier Plant
Vicinity of New Orleans, Louisiana

For: Chicago Bridge and Iron Company, Houston, Texas

SUMMARY OF LABORATORY TESTS ON UNDISTURBED SAMPLES

BORING 1

Sample No.	Depth in Ft.	Classification	Water Content Percent	Density Lbs./cu.ft. Dry	Density Lbs./cu.ft. Wet	Unconfined Compressive Strength Lbs./sq. ft.
1	2.5	Stiff tan & gray clay	31.5	89.0	117.1	2210
2	5.5	Medium stiff tan & gray clay	36.9	83.5	114.3	1080
3	8.5	Medium stiff tan & gray silty clay	31.9	90.3	119.1	1640
4	11.5	Very soft tan & gray silty clay	38.0	82.7	114.1	430
5	14.5	Soft gray silty clay	35.1	86.4	116.7	965
6	19.5	Very soft gray silty clay	35.6	85.1	115.4	400
7	24.5	Soft gray clay w/silt layers	34.6	85.7	115.4	620
8	29.5	Soft gray silty clay w/some organic matter	36.6	83.1	113.5	715
10	39.5	Soft gray clay w/sandy silt layers	61.1	63.7	102.6	605
11	44.5	Soft gray clay w/silty sand layers	46.0	72.9	107.9	860

Fig. 5

EUSTIS ENGINEERING COMPANY
CONSULTING FOUNDATION ENGINEERS
NEW ORLEANS LA

LOG OF BORING

Name of Project: Proposed Ammonia Storage Tank - American Cyanamid Company
Fortier Plant, Vicinity of New Orleans, Louisiana
For: Chicago Bridge & Iron Company, Houston, Texas

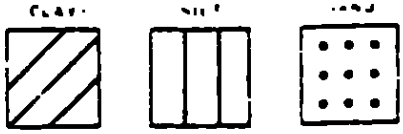
Boring No. 2 Field Engineer A. J. Mayeux Date 8 September 1961

Ground Elev. _____ Datum _____ Gr. Water Depth 3.0'

Sample No.	Sample (Ft.) From	Sample (Ft.) To	Depth Stratum (Ft.) From	Depth Stratum (Ft.) To	Visual Classification	*Blows Per Foot
1	2.5	3.0	0.0	3.0	Stiff tan & gray clay	
2	5.5	6.0	3.0	7.0	Medium stiff tan & gray clay	
3	8.5	9.0	7.0	10.0	Medium stiff tan & gray silty clay	
4	11.5	12.0	10.0	14.0	Loose tan & gray clayey silt	
5	14.5	15.0	14.0		Soft to medium stiff silty clay	
6	19.5	20.0			Ditto	
7	24.5	25.0		27.0	Ditto	
8	29.5	30.0	27.0		Soft gray clay w/sandy silt layers & lenses	
9	34.5	35.0		39.0	Ditto	7
10	39.0	40.5	39.0		Loose gray silty sand w/clay layers	5 13
11	41.5	43.0			Ditto	4 10
12	45.0	46.5		48.5	Ditto	9
13	48.5	50.0	48.5		Medium dense gray silty sand w/clay lenses	12 6 21
14	53.5	55.0			Ditto	6 20
15	58.5	60.0		63.5	Ditto	19 21
16	63.5	65.0	63.5	67.0	Very dense gray silty sand	30=0.4'
17	68.5	70.0	67.0		Dense gray silty sand	11 43
18	73.5	75.0			Ditto	9 48
19	78.5	80.0			Ditto	13 34
20	83.5	85.0			Ditto	30=0.7'
21	88.5	90.0		91.0	Ditto	30=0.7'
22	93.5	95.0	91.0		Very dense gray fine sand	30=0.4'
23	98.5	100.0		100.0	Ditto	30=0.5'

Boring coordinates: S1227 - E-613

Note:
First number in column headed "Blows per Foot" indicates the number of blows required to seat splitspoon sampler first 6 inches



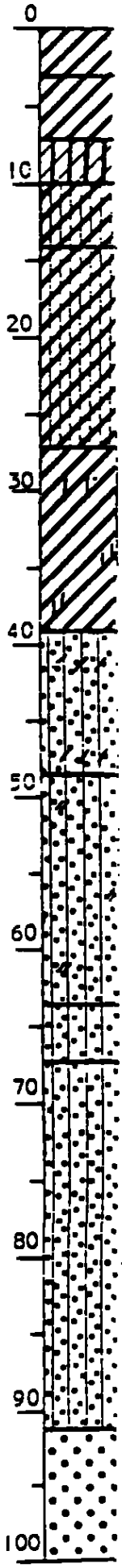


Fig. 3

Subsoil Investigation
Proposed Ammonia Storage Tank
American Cyanamid Company, Fortier Plant
Vicinity of New Orleans, Louisiana

For: Chicago Bridge and Iron Company, Houston, Texas

SUMMARY OF LABORATORY TESTS ON UNDISTURBED SAMPLES

BORING 2

Sample No.	Depth in Ft.	Classification	Water Content Percent	Density Lbs./cu. ft. Dry	Density Lbs./cu. ft. Wet	Unconfined Compressive Strength Lbs./sq. ft.
1	2.5	Stiff tan & gray clay	27.1	93.8	119.2	3310
2	5.5	Medium stiff tan & gray clay	32.1	88.9	117.4	1705
3	8.5	Medium stiff tan & gray silty clay	32.8	85.5	115.3	1140
4	11.5	Loose tan & gray clayey silt	36.0	85.6	116.4	$\phi=3^{0}$ c=75*
5	14.5	Medium stiff gray silty clay q	36.0	85.1	115.7	1350
7	24.5	Soft gray silty clay	39.3	81.1	113.0	710
9	34.5	Loose gray sandy silt w/silty clay lenses	34.3	85.2	114.4	$\phi=5^{0}$ c= 575*

BORING 3

1	2.5	Stiff tan & gray clay	26.9	97.1	123.2	2445
2	5.5	Medium stiff tan & gray clay	36.3	82.7	112.7	1375
4	11.5	Medium stiff tan & gray silty clay	38.0	82.5	113.9	1095
5	14.5	Medium stiff gray silty clay	43.5	77.6	111.4	1335
6	19.5	Soft gray clay w/sandy silt lenses	49.4	71.4	106.6	730
9	34.5	Medium stiff gray clay w/sandy silt lenses	57.9	65.3	103.1	1045

*Quick triaxial shear test. ϕ=Angle of internal friction; c=cohesion in lbs./sq. ft.

Fig. 6

EUSTIS ENGINEERING COMPANY
CONSULTING FOUNDATION ENGINEERS
NEW ORLEANS LA

LOG OF BORING

Name of Project: Proposed Ammonia Storage Tank - American Cyanamid Company
Fortier Plant, Vicinity of New Orleans, Louisiana
For: Chicago Bridge & Iron Company, Houston, Louisiana
Boring No. 3 Field Engineer A. J. Mayeux Date 8 September 1961
Ground Elev. Datum Gr. Water Depth 3.0'

Sample No.	Sample Depth		Strata Depth		Visual Classification	Blows Per Foot
			From	To		
1	2.5	3.0	0.0	3.0	Stiff tan & gray clay	
2	5.5	6.0	3.0		Medium stiff tan & gray clay	
3	8.5	9.0		10.0	Medium stiff tan & gray clay w/silt layers	
4	11.5	12.0	10.0	13.5	Medium stiff tan & gray silty clay	
5	14.5	15.0	13.5	17.0	Medium stiff silty clay	
6	19.5	20.0	17.0	22.0	Soft gray clay w/sandy silt lenses & trace of organic matter	
7	24.5	25.0	22.0	26.0	Loose gray clayey silt	
8	29.5	30.0	26.0	31.0	Soft gray clay w/silt layers	
9	34.5	35.0	31.0	39.0	Medium stiff gray clay w/sandy silt lenses	5
10	39.0	40.5	39.0		Loose gray silty sand w/clay layers	4 - 12
11	41.5	43.0			Ditto	5 - 10
12	45.0	46.5		48.5	Ditto	14
13	48.5	50.0	48.5		Medium dense gray silty sand w/clay lenses	10 - 7 - 19
14	53.5	55.0			Ditto	7 - 22
15	58.5	60.0		63.5	Ditto	18 - 29
16	63.5	65.0	63.5		Dense gray silty sand	30-0.6'
17	68.5	70.0			Ditto	17 - 38
18	73.5	75.0			Ditto	30-0.6'
19	78.5	80.0			Ditto	30-0.6'
20	83.5	85.0			Ditto	30-0.7'
21	88.5	90.0		93.5	Ditto	30-0.6'
22	93.5	95.0	93.5		Very dense gray fine sand	75-30-0.4'
23	98.5	100.00		100.0	Ditto	30-0.5'

Note: Boring coordinates: S1227 - E-655
First number in column headed "Blows per Foot" indicates the number of blows required to seat splitspoon sampler first 6 inches

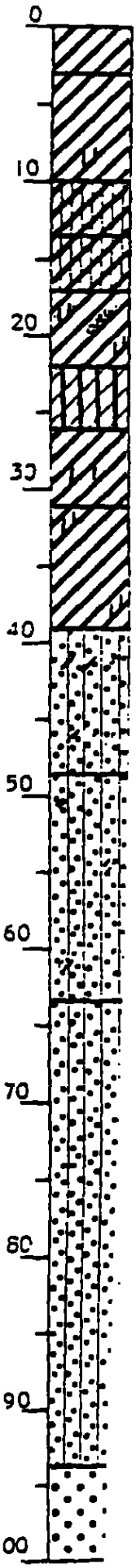


Fig. 4

Boring Group D

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE LA.

LOG OF BORING

Sheet 1 of 2

me of Project: American Cyanamid Company - Sulphuric Acid Plant
Fortier Plant Site, Jefferson Parish, Louisiana
For: American Cyanamid Company, Wayne, New Jersey

ring No. 1 Soil Technician F. O. Bragg Date 14 January 1976

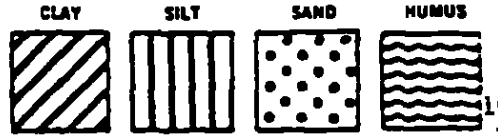
ound Elev. None Furnished Datum _____ Gr. Water Depth See Text

	SAMPLE Depth — Feet		DEPTH STRATUM Feet		VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
	From	To	From	To			
			0.0	0.4	River sand		
1	1.5	2.0	0.4		Stiff tan & gray clay w/silt lenses		
2	3.5	4.0		5.0	Ditto		
3	5.5	6.0	5.0	8.0	Extremely soft gray & tan silty clay		
					w/sandy silt pockets		
4	8.5	9.0	8.0		Soft gray & tan silty clay		
5	11.5	12.0		12.5	Ditto		
6	14.5	15.0	12.5	17.0	Very soft gray silty clay w/clayey		
					silt pockets		
7	19.5	20.0	17.0		Soft gray clay w/silty clay pockets		
8	24.5	25.0			Soft gray clay w/silt layers		
9	29.5	30.0		31.0	Ditto		
10	34.5	35.0	31.0	36.5	Very loose gray sandy silt w/clay		
					pockets		
11	39.5	40.0	36.5	42.0	Medium stiff gray clay w/sandy silt		
					lenses		
12	44.5	45.0	42.0		Stiff gray clay w/sandy silt lenses		
13	49.5	50.0		52.5	Ditto		
14	52.5	53.0	52.5		Loose gray sand w/few shell fragments		
15	53.0	54.5		55.0	Loose gray sand	2	4
16	55.0	56.5	55.0		Dense gray sand	9	30
17	57.5	59.0		59.5	Ditto	11	39
18	60.0	61.5	59.5	62.5	Medium dense gray sand w/few shell	7	25
					fragments		
19	63.5	65.0	62.5	68.5	Dense gray sand w/clay pockets	3	41
20	68.5	70.0	68.5	72.0	Very dense gray sand	15	50=8"

mber in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D. splitspoon sampler 6 in. Number in nd column indicates number of blows of 140-lb hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

E THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN. IT IS NOT WARRANTED THAT REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

Remarks: _____



Predominant type shown heavy. Modifying type shown light.

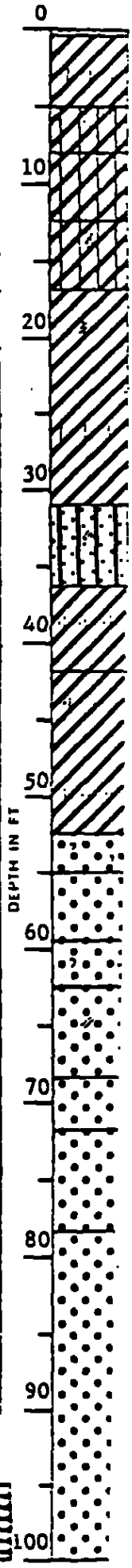


Fig.
(Sheet

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.

LOG OF BORING

Sheet 2 of 2

Name of Project: American Cyanamid Company - Sulphuric Acid Plant
Fortier Plant Site, Jefferson Parish, Louisiana
For: American Cyanamid Company, Wayne, New Jersey

Boring No. 1 (Cont'd) Soil Technician F. O. Bragg Date 14 January 1975
Ground Elev. None Furnished Datum Gr. Water Depth See Text

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
21	73.5	75.0	72.0	78.5	Dense gray sand	19	40
22	78.5	80.0	78.5		Very dense gray sand	15	50=9"
23	83.5	85.0			Ditto	18	50=9"
24	88.5	90.0			Ditto	25	50=7"
25	93.5	95.0			Ditto	23	50=7"
26	98.5	100.0		100.0	Ditto	20	50=8"

DEPTH IN FT

ber in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in O. D splitspoon sampler 6 in Number in nd column indicates number of blows of 140-lb. hammer dropped 30 in required to drive 2-in. O D. splitspoon sampler 1 ft. after seating 6 in.

ILE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CON-IONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN, IT IS NOT WARRANTED THAT E REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

CLAY SILT SAND HUMUS

Predominant type shown heavy. Modifying type shown light.

arks:

Fig.
(Sheet

Subsoil Investigation
American Cyanamid Company
Sulphuric Acid Plant
Fortier Plant Site
Jefferson Parish, Louisiana

For: American Cyanamid Company, Wayne, New Jersey

SUMMARY OF LABORATORY TEST RESULTS

BORING 1

Sample No.	Depth in Ft.	Classification	Water Content Percent	Density Lbs./Cu.Ft. Dry	Density Lbs./Cu.Ft. Wet	Unconfined Compressive Strength Lbs./Sq.Ft.
1	1.5	Stiff tan & gray clay w/silt lenses & shells	27.9	94.0	120.2	2450
2	3.5	Ditto	32.6	89.7	119.0	2240
3	5.5	Extremely soft gray & tan silty clay w/sandy silt pockets	38.3	80.9	111.9	200
4	8.5	Soft gray & tan silty clay	31.5	91.6	120.5	785
5	11.5	Ditto	36.7	85.3	116.6	630
6	14.5	Very soft gray silty clay w/clayey silt pockets	36.0	87.0	118.4	360
7	19.5	Soft gray clay w/silty clay layers	38.7	82.2	114.0	660
8	24.5	Soft gray clay w/silt layers	41.5	78.5	111.1	950
9	29.5	Soft gray silty clay	33.0	87.0	116.3	690
10	34.5	Very loose gray sandy silt w/clay pockets	32.0	89.3	117.9	$\phi=3^{o}c=150$*
11	39.5	Medium stiff gray clay with sandy silt lenses	36.8	83.7	114.5	1195
12	44.5	Stiff gray clay w/sandy silt lenses	52.4	69.9	106.6	2095
13	49.5	Ditto	58.8	65.7	104.3	2020

*Quick Triaxial Shear Test.
ϕ = Angle of internal friction;
c = Cohesion in pounds per sq. ft.

Fig. 7

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE LA

LOG OF BORING

Sheet 1 of 2

Name of Project: American Cyanamid Company - Sulphuric Acid Plant
Fortier Plant Site, Jefferson Parish, Louisiana
For: American Cyanamid Company, Wayne, New Jersey

Boring No. 2 Soil Technician F. O. Bragg & D. LeBlanc Date 15-16 January 1976

Ground Elev. None Furnished Datum _____ Gr. Water Depth See Text

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
			0.0	0.4	Shells		
1	1.5	2.0	0.4	2.5	Stiff gray & tan clay		
2	3.5	4.0	2.5		Medium stiff gray & tan clay		
3	5.5	6.0		7.0	Medium stiff gray & tan clay w/silt lenses		
4	8.5	9.0	7.0		Soft gray & tan silty clay		
5	11.5	12.0		12.5	Soft gray & tan silty clay w/clayey silt pockets		
6	14.5	15.0	12.5	17.0	Medium stiff gray silty clay w/clay pockets		
7	19.5	20.0	17.0	22.0	Soft gray silty clay w/clayey silt pockets & layers		
8	24.5	15.0	22.0		Medium stiff gray silty clay w/sandy silt lenses		
9	29.5	30.0		32.0	Medium stiff gray silty clay w/clay layers		
10	34.5	35.0	32.0		Soft gray silty clay w/sandy silt lenses		
	39.5	40.0		42.0	Soft gray silty clay w/clay lenses		
	44.5	45.0	42.0	48.5	Soft gray clay w/silt lenses		
	49.5	50.0	48.5	52.5	Medium stiff gray fissured clay w/wood		
	53.0	53.5	52.5		Medium dense gray sand		
	53.5	55.0			Ditto	3	29
	56.0	57.5		58.5	Medium dense gray sand w/clay layers	4	14
	58.5	60.0	58.5	60.0	Medium stiff gray clay w/sand & shell layers	3	13

*Number in first column indicates number of blows of 140-lb hammer dropped 30 in required to seat 2-in. O D splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

NOTE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN. IT IS NOT WARRANTED THAT REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

Remarks: _____

CLAY SILT SAND HUMUS

Predominant type shown heavy. Modifying type shown light.

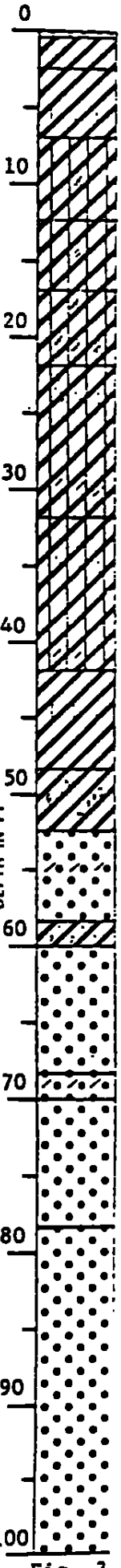


Fig. 3
(Sheet #1

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.

LOG OF BORING

Sheet 2 of 2

ume of Project: American Cyanamid Company - Sulphuric Acid Plant
Fortier Plant Site, Jefferson Parish, Louisiana
For: American Cyanamid Company, Wayne, New Jersey

ring No. 2 (Cont'd) Soil Technician F. O. Bragg & D. LeBlanc Date 15-16 January 1976
ound Elev. None Furnished Datum _____ Gr. Water Depth See Text

ple o.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
B	61.0	62.5	60.0		Dense gray sand	17	37
9	63.5	65.0			Ditto	12	38
D	66.0	67.5		68.5	Ditto	8	39
L	68.5	70.0	68.5	70.0	Medium dense gray sand w/clay layers	4	22
?	73.5	75.0	70.0	78.5	Dense gray sand	15	38
3	78.5	80.0	78.5		Very dense gray sand	18	50=4"
	83.5	85.0			Ditto	16	50=8"
;	88.5	90.0			Ditto	28	50=6"
,	93.5	95.0			Ditto	29	50=5"
	98.5	100.0		100.0	Ditto	13	50=7"

UEPTH IN FI

ber in first column indicates number of blows of 140-lb hammer dropped 30 in required to seat 2-in. O D splitspoon sampler 6 in Number in nd column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

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CLAY SILT SAND HUMUS

Predominant type shown heavy. Modifying type shown light.

arks: _____

Fig. 3
(Sheet #2

Subsoil Investigation
American Cyanamid Company
Sulphuric Acid Plant
Fortier Plant Site
Jefferson Parish, Louisiana

For: American Cyanamid Company, Wayne, New Jersey

SUMMARY OF LABORATORY TEST RESULTS

BORING 2

Sample No.	Depth in Ft.	Classification	Water Content Percent	Density Lbs./Cu.Ft. Dry	Density Lbs./Cu.Ft. Wet	Unconfined Compressive Strength Lbs./Sq.Ft.
1	1.5	Very stiff gray & tan clay	25.0	101.4	126.7	5240
2	3.5	Medium stiff gray & tan clay	43.2	77.8	111.4	1560
3	5.5	Medium stiff gray & tan clay w/silt lenses	33.2	-----	-----	----
4	8.5	Soft gray & tan silty clay	37.3	84.3	115.7	705
5	11.5	Soft gray & tan silty clay w/clayey silt pockets	35.7	85.8	116.4	830*
6	14.5	Medium stiff gray silty clay w/clay pockets	37.0	83.7	114.6	1045
7	19.5	Soft gray silty clay w/clayey silt layers	33.8	87.0	116.3	790*
8	24.5	Medium stiff gray silty clay w/sandy silt lenses	31.9	89.5	118.0	1135
9	29.5	Medium stiff gray silty clay w/clay layers	39.2	81.3	113.1	1085
10	34.5	Soft gray silty clay w/sandy silt lenses	32.2	89.7	118.5	840
11	39.5	Soft gray silty clay w/clay lenses	37.4	83.2	114.3	705
12	44.5	Soft gray clay w/silt lenses	58.2	65.6	103.8	895
13	49.5	Medium stiff gray fissured clay	63.1	62.3	101.7	1050

*Confined Compression Test Confined @ the Approximate Overburden Pressure.

Fig. 8

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.

LOG OF BORING

Sheet 1 of 2

ame of Project: American Cyanamid Company - Sulphuric Acid Plant
Fortier Plant Site, Jefferson Parish, Louisiana
For: American Cyanamid Company, Wayne, New Jersey

ring No. 3 Soil Technician F. O. Bragg & D. LeBlanc Date 16 January 1976

ound Elev. None Furnished Datum _____ Gr. Water Depth See Text

ple o.	SAMPLE Depth — Feet From	To.	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
1	1.5	2.0	0.0	2.5	Stiff brown & gray silty clay		
2	3.5	4.0	2.5	4.5	Medium stiff tan & gray clay w/silt lenses		
3	5.5	6.0	4.5	7.0	Stiff tan & gray clay		
4	8.5	9.0	7.0	10.5	Medium stiff tan & gray clay		
5	11.5	12.0	10.5		Soft tan & gray silty clay w/clayey silt pockets		
6	14.5	15.0		17.5	Ditto		
7	19.5	20.0	17.5	21.0	Soft gray clay w/silty clay lenses		
8	24.5	25.0	21.0		Soft gray silty clay w/clay pockets & sand lenses		
	29.5	30.0		32.0	Soft gray silty clay w/clay pockets		
	34.5	35.0	32.0	37.0	Very loose gray clayey silt w/silty clay lenses		
	39.5	40.0	37.0	44.0	Soft gray clay w/sandy silt lenses		
	44.5	45.0	44.0	46.0	Soft gray fissured clay w/silty sand lenses		
9	49.5	50.0	46.0		Loose gray sand w/clay layers		
10	54.5	55.0			Loose gray sand w/few shell fragments		
11	55.0	56.5		57.5	Ditto	1	4
12	58.5	60.0	57.5	60.5	Medium dense gray sand w/clay layers	10	28
13	61.0	62.5	60.5	63.5	Dense gray sand	11	41
14	63.5	65.0	63.5		Very dense gray sand	17	50=7"
15	66.0	67.5		68.0	Ditto	28	50=6"
16	68.5	70.0	68.0	72.0	Dense gray sand w/clay pockets	12	33
17	73.5	75.0	72.0		Very dense gray sand	18	50=6"

DEPTH IN FT
0
10
20
30
40
50
60
70
80
90
100

ber in first column indicates number of blows of 140-lb hammer dropped 30 in. required to seat 2-in. O. D splitspoon sampler 6 in. Number in d column indicates number of blows of 140-lb hammer dropped 30 in. required to drive 2-in O. D. splitspoon sampler 1 ft. after seating 6 in.

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CLAY SILT SAND HUMUS

Predominant type shown heavy. Modifying type shown light.

arks: _____

Fig. 4
(Sheet #1

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.

LOG OF BORING

Name of Project: American Cyanamid Company - Sulphuric Acid Plant
Fortier Plant Site, Jefferson Parish, Louisiana
For: American Cyanamid Company, Wayne, New Jersey

Boring No. 3 (Cont'd) Soil Technician F. O. Bragg & D. LeBlanc Date 16 January 1976
Ground Elev. None Furnished Datum _____ Gr. Water Depth See Text

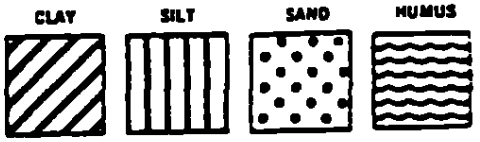
Boring No.	SAMPLE Depth — Feet From	SAMPLE Depth — Feet To	DEPTH STRATUM Feet From	DEPTH STRATUM Feet To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
12	78.5	80.0			Very dense gray sand w/few shell fragments	22	50=6"
13	83.5	85.0			Very dense gray sand	20	50=7"
14	88.5	90.0			Ditto	20	50=9"
15	93.5	95.0			Ditto	18	50=7"
16	98.5	100.0		100.0	Ditto	50=7" (Seat)	

DEPTH IN FT

*Number in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb. hammer dropped 30 in required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

NOTE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN. IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

Remarks: _____



Predominant type shown heavy Modifying type shown light.

Fig. 4
(Sheet #2)

Subsoil Investigation
American Cyanamid Company
Sulphuric Acid Plant
Fortier Plant Site
Jefferson Parish, Louisiana

For: American Cyanamid Company, Wayne, New Jersey

SUMMARY OF LABORATORY TEST RESULTS

BORING 3

Sample No.	Depth in Ft.	Classification	Water Content Percent	Density Lbs./Cu.Ft. Dry	Density Lbs./Cu.Ft. Wet	Unconfined Compressive Strength Lbs./Sq.Ft.
1	1.5	Stiff brown & gray silty clay	25.2	97.2	121.9	2890
2	3.5	Medium stiff tan & gray clay w/silt lenses	34.9	86.9	117.2	1755
3	5.5	Stiff tan & gray clay	29.0	94.1	121.4	2065
4	8.5	Medium stiff tan & gray clay	32.1	90.3	119.3	1535
5	11.5	Soft tan & gray silty clay	35.1	87.1	117.7	565
6	14.5	Ditto	35.2	87.3	118.0	765
7	19.5	Alternate lenses of soft gray clay & silty clay	34.2	88.3	118.5	970
8	24.5	Soft gray silty clay w/sand lenses	36.7	83.6	114.3	715
9	29.5	Soft gray silty clay w/clay pockets	32.9	87.0	115.6	690
10	34.5	Very loose gray clayey silt w/silty clay lenses	33.2	87.8	116.9	$\phi=2^{o}$ c=145*
11	39.5	Soft gray clay w/sandy silt lenses	46.7	74.6	109.4	995
12	44.5	Soft gray fissured clay with silty sand lenses	55.4	67.2	104.4	885
13	49.5	Loose gray sand w/thick clay layers	31.6	----	-----	----

*Quick Triaxial Shear Test.
ϕ = Angle of internal friction;
c = Cohesion in pounds per sq. ft.

Fig. 9

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE LA.

LOG OF BORING

Sheet 1 of 2

Name of Project: American Cyanamid Company - Sulphuric Acid Plant
Fortier Plant Site, Jefferson Parish, Louisiana
For: American Cyanamid Company, Wayne, New Jersey

Boring No. 4 Soil Technician F. O. Bragg & D. LeBlanc Date 19-20 January 1976

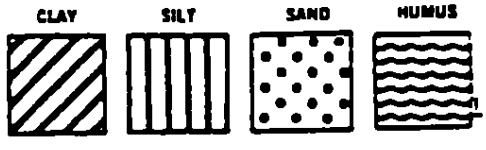
Ground Elev. None Furnished Datum _____ Gr. Water Depth See Text

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
1	1.5	2.0	0.0		Medium stiff tan & gray silty clay		
2	3.5	4.0		4.5	Ditto		
3	5.5	6.0	4.5		Medium stiff gray & tan clay w/silt lenses		
4	8.5	9.0		11.0	Ditto		
5	11.5	12.0	11.0	12.5	Medium stiff gray & tan silty clay		
6	14.5	15.0	12.5	17.0	Soft gray clay w/silt layers		
7	19.5	20.0	17.0	23.0	Medium stiff gray silty clay		
8	24.5	25.0	23.0	26.0	Loose gray sandy silt w/silty clay pockets		
9	29.5	30.0	26.0	32.0	Medium stiff gray clay w/sandy silt lenses & pockets		
10	34.5	35.0	32.0	38.0	Medium stiff gray silty clay w/sandy silt lenses		
11	39.5	40.0	38.0	42.0	Soft gray fissured clay w/silty sand lenses		
12	44.5	45.0	42.0	49.0	Medium stiff gray clay w/silty sand lenses		
13	48.5	49.5	49.0		Medium dense gray sand w/few shell fragments		
14	49.5	51.0		53.0	Medium dense gray sand	4	17
15	52.0	53.5	53.0		Dense gray sand	6	37
16	54.0	55.5		56.0	Ditto	8	36
17	56.0	57.5	56.0		Medium dense gray sand w/clay pockets	6	21
18	58.5	60.0		63.5	Ditto	9	13
19	63.5	65.0	63.5		Very dense gray sand	12	50=9"

*Number in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D. splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN. IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

Remarks: Boring offset 4' south & 6' west of stake.



Predominant type shown heavy. Modifying type shown light.

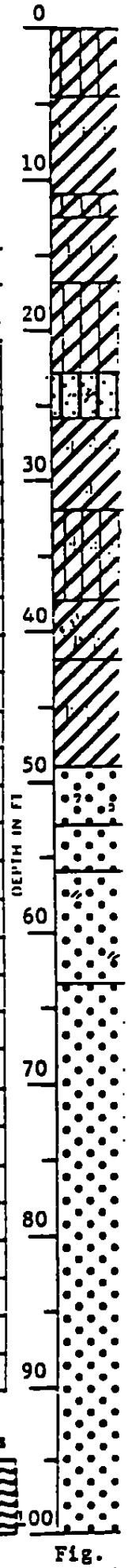


Fig. (Sheet #

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.

LOG OF BORING

Sheet 2 of 2

Title of Project: American Cyanamid Company - Sulphuric Acid Plant
Fortier Plant Site, Jefferson Parish, Louisiana

For: American Cyanamid Company, Wayne, New Jersey

Boring No. 4 (Cont'd) Soil Technician F. O. Bragg & D. LeBlanc Date 19-20 January 1976

Ground Elev. None Furnished Datum _____ Gr. Water Depth See Text

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
20	68.5	70.0			Very dense gray sand	20	50=6"
21	73.5	75.0			Ditto	21	50=9"
22	78.5	80.0			Ditto	23	50=6"
23	83.5	85.0			Ditto	20	50=8"
24	88.5	90.0			Ditto	18	50=8"
25	93.5	95.0			Ditto	22	50=7"
26	98.5	100.0		100.0	Ditto	18	50=6"

DEPTH IN FT

*Number in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D. splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb. hammer dropped 30 in required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

WHILE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN, IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

Remarks: Boring offset 4' south & 6' west of stake.

CLAY SILT SAND HUMUS

Predominant type shown heavy. Modifying type shown light.

Fig. 5
(Sheet #2)

Subsoil Investigation
American Cyanamid Company
Sulphuric Acid Plant
Fortier Plant Site
Jefferson Parish, Louisiana

For: American Cyanamid Company, Wayne, New Jersey

SUMMARY OF LABORATORY TEST RESULTS

BORING 4

Sample No.	Depth in Ft.	Classification	Water Content Percent	Density Lbs./Cu.Ft. Dry	Density Lbs./Cu.Ft. Wet	Unconfined Compressive Strength Lbs./Sq.Ft.
1	1.5	Medium stiff tan & gray silty clay	28.2	90.1	115.5	1675
2	3.5	Ditto	42.8	76.6	109.3	1295
3	5.5	Medium stiff gray & tan clay w/silt lenses	29.6	92.4	119.8	1405
4	8.5	Ditto	34.5	85.6	115.2	1120
5	11.5	Medium stiff gray & tan silty clay	35.6	86.1	116.7	1330
6	14.5	Soft gray clay w/silt layers	41.4	75.9	107.3	850*
7	19.5	Medium stiff gray silty clay	37.0	82.5	113.0	1220
9	29.5	Medium stiff gray clay with sandy silt lenses	38.8	79.5	110.4	1180
10	34.5	Medium stiff gray silty clay w/sandy silt layers	31.1	88.8	116.4	1250*
11	39.5	Soft gray fissured clay	61.0	64.4	103.6	870
12	44.5	Medium stiff gray clay with silty sand lenses	49.5	70.8	105.9	1330

*Confined Compression Test Confined @ the Approximate Overburden Pressure.

Fig. 10

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.

LOG OF BORING

Sheet 1 of 2

Name of Project: American Cyanamid Company - Sulphuric Acid Plant
Fortier Plant Site, Jefferson Parish, Louisiana
For: American Cyanamid Company, Wayne, New Jersey

Boring No. 5 Soil Technician F. O. Bragg & D. LeBlanc Date 15 January 1976

Ground Elev. None Furnished Datum _____ Gr. Water Depth See Text

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
1	1.5	2.0	0.0	2.5	Stiff brown & gray silty clay w/roots		
2	3.5	4.0	2.5	5.0	Soft tan & gray silty clay w/sandy silt pockets & clay lenses		
3	5.5	6.0	5.0		Medium stiff gray & tan clay		
4	8.5	9.0			Ditto		
5	11.5	12.0		12.5	Ditto		
6	14.5	15.0	12.5	17.0	Soft gray clay w/silt pockets		
7	19.5	20.0	17.0	22.0	Soft gray silty clay w/sandy silt lenses		
8	24.5	25.0	22.0	28.5	Loose gray sandy silt w/clay pockets & sand lenses		
9	29.5	30.0	28.5	34.0	Soft gray clay w/sand layers		
10	34.5	35.0	34.0	37.0	Loose gray silty sand w/clay layers		
11	39.5	40.0	37.0		Soft gray clay w/sand lenses		
12	44.5	45.0		47.0	Ditto		
13	49.5	50.0	47.0	53.0	Medium stiff gray clay w/sand lenses		
14	53.0	53.5	53.0		Medium dense gray sand		
15	53.5	55.0			Ditto	2	11
16	56.0	57.5		59.0	Medium dense gray sand w/thin clay layers	5	22
17	58.5	60.0	59.0		Dense gray sand w/clay pockets	3	38
18	61.0	62.5			Dense gray sand	8	35
19	63.5	65.0			Dense gray sand w/few shell fragments	7	46
20	68.5	70.0		74.0	Dense gray sand	11	33
21	73.5	75.0	74.0		Very dense gray sand w/small clay pockets	14	50=10"

DEPTH IN FT: 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100

* in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D. splitspoon sampler 6 in. Number in column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

HELP THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN. IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

Remarks: _____

CLAY SILT SAND HUMUS

Predominant type shown heavy. Modifying type shown light.

Fig. 6
(Sheet #1)

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.

LOG OF BORING

Sheet 2 of 2

me of Project: American Cyanamid Company - Sulphuric Acid Plant
Fortier Plant Site, Jefferson Parish, Louisiana
For: American Cyanamid Company, Wayne, New Jersey

ring No. 5 (Cont'd) Soil Technician F. O. Bragg & D. LeBlanc Date 15 January 1976
ound Elev. None Furnished Datum Gr. Water Depth See Text

ple	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
2	78.5	80.0			Very dense gray sand	17	50=6"
3	83.5	85.0			Ditto	28	50=6"
4	88.5	90.0			Ditto	20	50=8"
5	93.5	95.0			Ditto	24	50=6"
6	98.5	100.0		100.0	Ditto	11	53

DEPTH IN FT

ber in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in O. D. splitspoon sampler 6 in. Number in nd column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in O. D. splitspoon sampler 1 ft. after seating 6 in

LE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN. IT IS NOT WARRANTED THAT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

CLAY SILT SAND HUMUS

Predominant type shown heavy. Modifying type shown light.

Remarks:

Fig. 6
(Sheet #2

Subsoil Investigation
American Cyanamid Company
Sulphuric Acid Plant
Fortier Plant Site
Jefferson Parish, Louisiana

For: American Cyanamid Company, Wayne, New Jersey

SUMMARY OF LABORATORY TEST RESULTS

BORING 5

Sample No.	Depth in Ft.	Classification	Water Content Percent	Density Lbs./Cu.Ft. Dry	Density Lbs./Cu.Ft. Wet	Unconfined Compressive Strength Lbs./Sq.Ft.
1	1.5	Stiff brown & gray silty clay w/roots	23.8	96.2	119.2	2560
2	3.5	Soft tan & gray silty clay w/clay lenses	35.0	86.3	116.5	845
3	5.5	Medium stiff gray & tan clay	41.9	79.3	112.5	1175
4	8.5	Ditto	35.8	86.1	116.9	1205
5	11.5	Ditto	36.7	85.5	116.9	1220
6	14.5	Soft gray clay w/silt pockets	43.9	77.3	111.2	630
7	19.5	Soft gray silty clay w/sandy silt lenses	36.7	84.7	115.7	720*
8	24.5	Loose gray sandy silt w/clay lenses	38.7	83.6	116.0	$\phi=3^{o}$ c=295**
9	29.5	Soft gray clay w/sand layers	48.5	73.8	109.7	995
11	39.5	Soft gray clay w/sand lenses	42.2	77.8	110.6	910
12	44.5	Ditto	49.9	71.8	107.8	770
13	49.5	Medium stiff gray clay with sand lenses	46.7	73.9	108.2	1385

*Confined Compression Test Confined @ the Approximate Overburden Pressure.

**Quick Triaxial Shear Test.
ϕ = Angle of internal friction;
c = Cohesion in pounds per sq. ft.

Fig. 11

Boring Group E

LOG OF BORING

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE LA

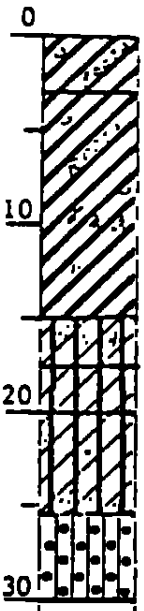
Name of Project: American Cyanamid Company
Sludge Disposal - Fortier Plant
Jefferson Parish, Louisiana

For: Waldemar S. Nelson & Co., Inc., Engineers & Architects, New Orleans, La.

Boring No. 1 Soil Technician R. Courtiade Date 11 February 1981

Ground Elev. _____ Datum _____ Gr. Water Depth See Text

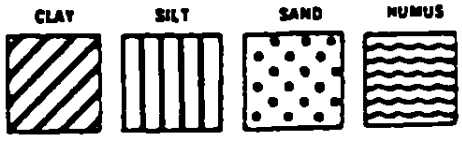
Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
1	2.0	2.5	0.0	3.0	Very stiff gray & tan clay (CH) with shells & small roots		
2	5.0	5.5	3.0		Medium stiff gray & tan clay (CH) with shells & small roots		
3	8.0	8.5			Medium stiff gray & tan clay (CH) with shells & silty clay layers		
4	11.0	11.5			Medium stiff gray & tan clay (CH) with silt pockets & silty clay layers		
5	14.0	14.5		15.0	Ditto		
6	16.5	17.0	15.0	17.5	Very loose gray clayey silt (ML) w/sandy silt layers		
7	18.5	19.0	17.5	20.0	Medium compact gray clayey silt (ML) w/trace of sand		
8	23.5	24.0	20.0	25.5	Loose gray clayey silt (ML) w/trace of sand & sandy silt layers		
9	25.5	27.0	25.5		Medium dense gray silty fine sand (SM)	6	19
10	28.5	30.0		30.0	Ditto	6	19



DEPTH IN FT

*Number in first column indicates number of blows of 140-lb hammer dropped 30 in required to seat 2 in O D split-spoon sampler 6 in Number in second column indicates number of blows of 140-lb hammer dropped 30 in required to drive 2-in O D split-spoon sampler 1 ft after seating 6 in

WHILE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES



Predominant type shown heavy Modifying type shown light

Remarks: _____

Enc. 2

LOG OF BORING

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE LA

Sheet 1 of 2

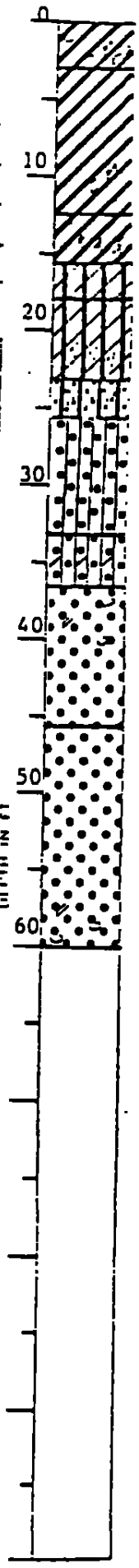
Name of Project: American Cyanamid Company
Sludge Disposal - Fortier Plant
Jefferson Parish, Louisiana

For: Waldemar S. Nelson & Co., Inc., Engineers & Architects, New Orleans, La.

Boring No. 2 Soil Technician R. Courriade Date 12 February 1981

Ground Elev. _____ Datum _____ Gr. Water Depth See Text

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
1	2.0	2.5	0.0	3.0	Stiff gray & tan clay (CH) w/shells, organic matter, small roots & silty clay layers		
2	5.0	5.5	3.0		Medium stiff gray & tan clay (CH) w/silt pockets		
3	8.0	8.5			Medium stiff gray & tan clay (CH) w/trace of silt & organic matter		
4	11.0	11.5		12.5	Medium stiff gray & tan clay (CH) w/silt pockets		
5	14.0	14.5	12.5	15.5	Medium stiff gray clay (CH) w/silt pockets & silty clay layers		
6	16.5	17.0	15.5	18.0	Loose gray clayey silt (ML)		
7	18.5	19.0	18.0	23.0	Very loose gray clayey silt (ML) w/sandy silt layers		
8	23.5	25.0	23.0	25.5	Loose gray sandy silt (ML) w/silty sand layers	4	9
9	26.0	27.5	25.5		Medium dense gray silty fine sand (SM)	4	11
10	28.5	30.0			Ditto	4	13
11	31.0	32.5		33.0	Ditto	5	11
12	33.5	35.0	33.0	36.5	Loose gray silty fine sand (SM) w/clay layers	2	10
13	38.5	40.0	36.5		Medium dense gray & tan fine sand (SP-SM) w/clay pockets & shell fragments	2	15
14	43.5	45.0		45.5	Medium dense gray & tan fine sand (SP-SM)	8	29



*Number in first column indicates number of blows of 140-lb hammer dropped 30 in required to seat 2 in O D split-spoon sampler 6 in Number in second column indicates number of blows of 140 lb hammer dropped 30 in required to drive 2 in O D split-spoon sampler 1 ft after seating 6 in

WHILE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN, IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES

CLAY SILT SAND HUMUS

Predominant type shown heavy Modifying type shown light

Remarks: _____

Enc. 3
(Sheet #1)

LOG OF BORING

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE LA

Name of Project: American Cyanamid Company
Sludge Disposal - Fortier Plant
Jefferson Parish, Louisiana

For: Waldemar S. Nelson & Co., Inc., Engineers & Architects, New Orleans, La.

Boring No. 2 Soil Technician R. Courtiade Date 12 February 1981

Ground Elev. _____ Datum _____ Gr. Water Depth See Text

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
15	48.5	50.0	45.5		Dense gray & tan fine sand (SP-SM)	7	32
16	53.5	55.0			Ditto	8	35
17	58.5	60.0		60.0	Dense gray & tan fine sand (SP-SM) w/clay pockets & shells	5	35

DEPTH IN FT

*Number in first column indicates number of blows of 140-lb hammer dropped 30 in required to seat 2 in O D split-spoon sampler 6 in Number in second column indicates number of blows of 140-lb hammer dropped 30 in required to drive 2-in O D split-spoon sampler 1 ft after seating 6 in

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CLAY SILT SAND HUMUS

Predominant type shown heavy Modifying type shown light

Remarks: _____

Enc. 3
(Sheet #2

LOG OF BORING

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE LA

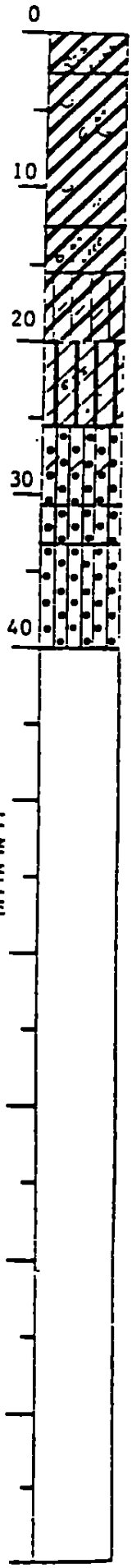
Name of Project: American Cyanamid Company
Sludge Disposal - Fortier Plant
Jefferson Parish, Louisiana

For: Waldemar S. Nelson & Co., Inc., Engineers & Architects, New Orleans, La.

Boring No. 3 Soil Technician R. Courtiade Date 12 February 1981

Ground Elev. _____ Datum _____ Gr. Water Depth See Text

Sample No	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
1	1.0	1.5	0.0	2.5	Stiff gray & tan clay (CH) w/roots, shells & small pieces of concrete (Fill)		
2	5.0	5.5	2.5		Medium stiff gray & tan clay (CH) with shells & trace of organic matter		
3	8.0	8.5			Medium stiff gray & tan clay (CH) with few shell fragments & silt pockets		
4	11.0	11.5		12.5	Medium stiff gray & tan clay (CH) w/silt pockets		
5	14.0	14.5	12.5	15.5	Medium stiff gray & tan flocculated clay (CH) w/trace of organic matter		
6	16.5	17.0	15.5		Soft to medium stiff gray silty clay (CL) w/clay layers & lenses		
7	18.5	19.0		20.0	Ditto		
8	23.5	24.0	20.0	25.5	Loose gray clayey silt (ML) w/few roots & trace of sand		
9	26.0	27.5	25.5		Medium dense gray silty fine sand(SM) w/clay layers	5	13
10	28.5	30.0		30.5	Medium dense gray silty fine sand(SM)	3	11
11	31.0	32.5	30.5	33.0	Loose gray silty fine sand(SM)	4	10
12	33.5	35.0	33.0		Medium dense gray silty fine sand (SM)	3	15
13	36.0	37.5		40.0	Ditto	7	24



*Number in first column indicates number of blows of 140-lb hammer dropped 30 in required to seat 2 in O D splitspoon sampler 6 in Number in second column indicates number of blows of 140-lb hammer dropped 30 in required to drive 2-in O D splitspoon sampler 1 ft after seating 6 in

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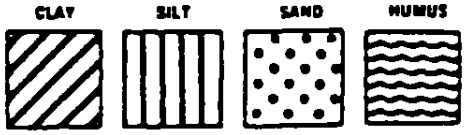


Predominant type shown heavy Modifying type shown light

Remarks: _____

Enc. 4

LOG OF BORING

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE LA

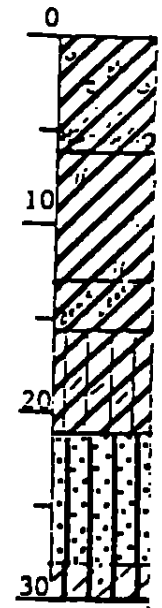
Name of Project: American Cyanamid Company
Sludge Disposal - Fortier Plant
Jefferson Parish, Louisiana

For: Waldemar S. Nelson & Co., Inc., Engineers & Architects, New Orleans, La.

Boring No. 4 Soil Technician R. Courtiade Date 13 February 1981

Ground Elev. _____ Datum _____ Gr. Water Depth See Text

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
1	2.0	2.5	0.0		Stiff gray & tan clay (CH) w/organic matter, shells & sandy clay layers		
2	5.0	5.5		6.0	Stiff gray & tan clay (CH) w/organic matter, roots & clayey silt layers		
3	8.0	8.5	6.0		Medium stiff gray & tan clay (CH) w/silt pockets		
4	11.0	11.5		13.0	Ditto		
5	14.0	14.5	13.0	15.5	Medium stiff gray & tan flocculated clay (CH) w/few concretions		
6	16.5	17.0	15.5		Very soft to soft gray silty clay (CL) w/clay layers		
7	18.5	19.0		21.0	Ditto		
8	23.5	25.0	21.0		Loose gray sandy silt (ML)	3	9
9	26.0	27.5		28.0	Ditto	2	7
10	28.5	30.0	28.0	30.0	Very loose gray clayey silt (ML) w/trace of sand	2	4



*Number in first column indicates number of blows of 140-lb hammer dropped 30 in required to seat 2-in O D split-spoon sampler 6 in Number in second column indicates number of blows of 140-lb hammer dropped 30 in required to drive 2-in O D split-spoon sampler 1 ft after seating 6 in

WHILE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES

CLAY SILT SAND HUMUS

Predominant type shown heavy Modifying type shown light

Remarks: _____

Enc. 5

LOG OF BORING

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE LA

Name of Project: American Cyanamid Company
Sludge Disposal - Fortier Plant
Jefferson Parish, Louisiana

For: Waldemar S. Nelson & Co., Inc., Engineers & Architects, New Orleans, La.

Boring No. 5 Soil Technician R. Courriade Date 13 February 1981

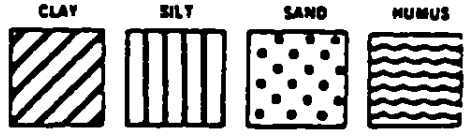
Ground Elev. _____ Datum _____ Gr. Water Depth See Text

Sample No	SAMPLE Depth — Feet From	SAMPLE Depth — Feet To	DEPTH STRATUM Feet From	DEPTH STRATUM Feet To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
1	2.0	2.5	0.0	3.0	Stiff gray & tan clay (CH) w/clayey silt layers, roots & organic matter		
2	5.0	5.5	3.0		Medium stiff gray & tan clay (CH) w/silt pockets & organic matter		
3	8.0	8.5		9.0	Ditto		
4	11.0	11.5	9.0	12.0	Stiff brown & gray clay (CH) w/organic matter & few silt pockets		
5	14.0	14.5	12.0	15.5	Stiff tan & gray clay (CH) w/organic matter & few silt pockets		
	16.5	17.0	15.5	17.5	Soft gray clay (CH) w/clayey silt lenses		
7	18.5	19.0	17.5	21.5	Very soft gray silty clay (CL) with clayey silt layers		
8	23.5	25.0	21.5		Loose gray clayey silt (ML) w/trace of sand	2	6
9	26.0	27.5			Loose gray clayey silt (ML) w/clay layers	3	7
10	28.5	30.0		30.0	Loose gray clayey silt (ML) w/sandy silt & silty sand layers	1	5

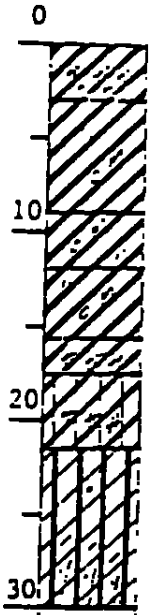
*Number in first column indicates number of blows of 140-lb hammer dropped 30 in required to seat 2 in O D split-spoon sampler 6 in Number in second column indicates number of blows of 140-lb hammer dropped 30 in required to drive 2-in O D split-spoon sampler 1 ft after seating 6 in

WHILE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN, IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES

Remarks: _____



Predominant type shown heavy Modifying type shown light.



Enc. 6

Soil Borings & Laboratory Tests
American Cyanamid Company
Sludge Disposal
Fortier Plant
Jefferson Parish, Louisiana

For: Waldemar S. Nelson & Co., Inc., Engineers & Architects, New Orleans, La.

SUMMARY OF LABORATORY TEST RESULTS

BORING 1

Sample No.	Depth in Feet	Classification	Water Content Percent
1	2.0	Very stiff gray & tan clay (CH) with shells & small roots	31.8
2	5.0	Medium stiff gray & tan clay (CH) w/shells & small roots	27.7
3	8.0	Medium stiff gray & tan clay (CH) w/shells & silty clay layers	30.3
6	16.5	Very loose gray clayey silt (ML) w/sandy silt layers	31.8
7	18.5	Medium compact gray clayey silt (ML) w/trace of sand	36.9
8	23.5	Loose gray clayey silt (ML) w/trace of sand & sandy silt layers	35.3

BORING 2

1	2.0	Stiff gray & tan clay (CH) w/trace of organic matter, silt & roots	27.7
2	5.0	Medium stiff gray & tan clay (CH) w/silt pockets	29.4
3	8.0	Medium stiff gray & tan clay (CH) w/trace of silt & organic matter	29.7
8	23.5	Loose gray sandy silt (ML) w/silty sand layers	33.7

BORING 3

1	1.0	Stiff gray & tan clay (CH) w/roots & shells (Fill)	24.3
2	5.0	Medium stiff gray & tan clay (CH) w/shells & trace of organic matter	32.4
3	8.0	Medium stiff gray & tan clay (CH) w/few shell fragments & silt pockets	28.3
5	14.0	Medium stiff gray & tan flocculated clay (CH) w/trace of organic matter	44.7
7	18.5	Medium stiff gray silty clay (CL) w/clay layers & lenses	34.7

Soil Borings & Laboratory Tests
American Cyanamid Company
Sludge Disposal
Fortier Plant
Jefferson Parish, Louisiana

For: Waldemar S. Nelson & Co., Inc., Engineers & Architects, New Orleans, La.

SUMMARY OF LABORATORY TEST RESULTS

BORING 4

Sample No.	Depth in Feet	Classification	Water Content Percent
1	2.0	Stiff gray & tan clay (CH) w/organic matter, shells & sandy clay layers	24.9
2	5.0	Stiff gray & tan clay (CH) w/orgnaic matter & clayey silt layers	27.6
3	8.0	Medium stiff gray & tan clay (CH) w/silt pockets	29.6
5	14.0	Medium stiff gray & tan flocculated clay (CH) w/few concretions	44.1
8	23.5	Loose gray sandy silt (ML)	34.7

BORING 5

1	2.0	Stiff gray & tan clay (CH) w/clayey silt layers	40.2
2	5.0	Medium stiff gray & tan clay (CH) w/silt pockets & organic matter	30.1
3	8.0	Ditto	30.8
6	16.5	Soft gray clay (CH) w/clayey silt lenses	35.6
8	23.5	Loose gray clayey silt (ML) w/trace of sand	34.7

Enc. 8

Soil Borings & Laboratory Tests
American Cyanamid Company
Sludge Disposal
Fortier Plant
Jefferson Parish, Louisiana

For: Waldemar S. Nelson & Co., Inc., Engineers & Architects, New Orleans, La.

SUMMARY OF LABORATORY PERMEABILITY TESTS

BORING 1

Sample No.	Depth in Feet	Classification	Water Content Percent		Density lb/cu ft		Atterberg Limits			Coefficient of Permeability in Cms/Second
			Initial	Final	Dry	Wet	LL	PL	PI	
4	11.0	Medium stiff gray & tan clay (CH) w/silt pockets	33.1	34.6	87.5	116.4	72	23	49	1.2×10^{-8}
5	14.0	Ditto	43.5	45.5	75.9	108.9	87	28	59	6.8×10^{-9}

BORING 2

4	11.0	Medium stiff gray & tan clay (CH) w/silt pockets	34.0	34.8	86.4	115.8	72	22	50	1.3×10^{-8}
5	14.0	Medium stiff gray clay (CH) w/silty clay layers	39.5	40.5	80.7	112.5	56	19	37	5.7×10^{-8}
6	16.5	Loose gray clayey silt (ML)	33.9	36.1	85.2	114.1	30	23	7	1.1×10^{-5}

Enc. 9

Soil Borings & Laboratory Tests
American Cyanamid Company
Sludge Disposal
Fortier Plant
Jefferson Parish, Louisiana

For: Waldemar S. Nelson & Co., Inc., Engineers & Architects, New Orleans, La.

SUMMARY OF LABORATORY PERMEABILITY TESTS

BORING 3

Sample No.	Depth in Feet	Classification	Water Content Percent		Density Lb/cu ft		Atterberg Limits			Coefficient of Permeability in Cms/Second
			Initial	Final	Dry	Wet	LL	PL	PI	
4	11.0	Medium stiff gray & tan clay (CH) w/silt pockets	36.9	37.8	83.5	114.5	65	22	43	8.1×10^{-9}
6	16.5	Soft gray silty clay (CL)	37.1	37.5	84.5	115.8	39	23	16	9.6×10^{-7}
8	23.5	Loose gray clayey silt (ML) w/trace of sand	35.8	37.0	84.4	114.7	28	25	3	5.7×10^{-5}

BORING 4

4	11.0	Medium stiff gray & tan clay (CH) w/silt pockets	34.1	35.3	86.8	116.4	67	23	44	1.3×10^{-8}
6	16.5	Soft gray silty clay (CL)	33.2	34.2	87.8	116.9	37	23	14	5.5×10^{-7}
7	18.5	Very soft gray silty clay (CL)	34.4	36.0	85.8	115.3	31	23	8	1.1×10^{-6}

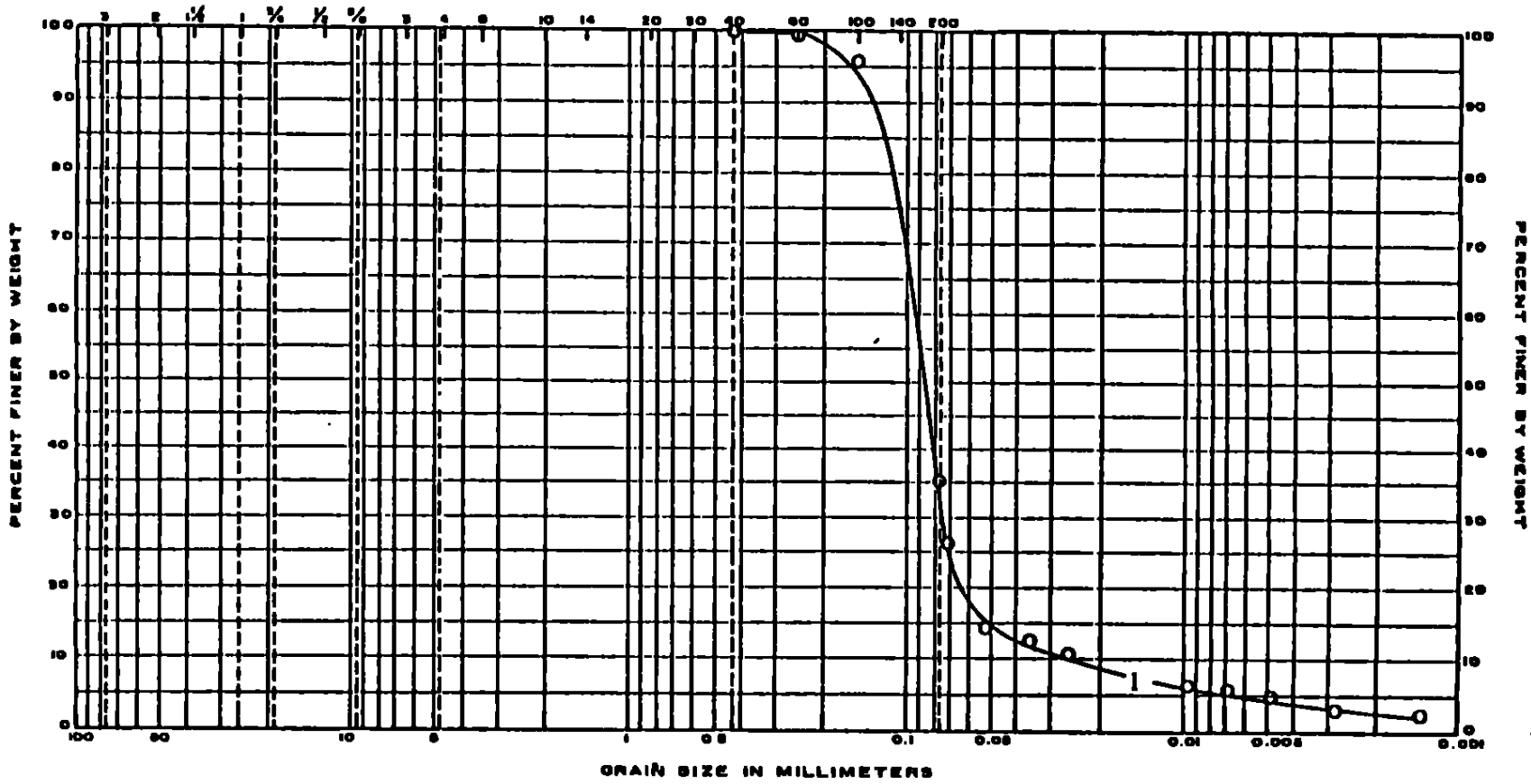
Soil Borings & Laboratory Tests
American Cyanamid Company
Sludge Disposal
Fortier Plant
Jefferson Parish, Louisiana

For: Waldemar S. Nelson & Co., Inc., Engineers & Architects, New Orleans, La.

SUMMARY OF LABORATORY PERMEABILITY TESTS

BORING 5

Sample No.	Depth in Feet	Classification	Water Content Percent		Density Lb/cu ft		Atterberg Limits			Coefficient of Permeability in Cms/Second
			Initial	Final	Dry	Wet	LL	PL	PI	
4	11.0	Stiff brown & gray clay (CH) w/trace of silt	35.5	35.8	86.0	116.5	67	22	45	6.7×10^{-9}
5	14.0	Stiff tan & gray clay (CH)	49.2	50.2	71.9	107.2	99	31	68	3.3×10^{-9}
7	18.5	Very soft gray silty clay (CL)	38.8	39.6	81.6	113.3	37	22	15	3.7×10^{-7}



UNIFIED	GRAVEL			SAND			SILT OR CLAY		
	COARSE	FINE		COARSE	MEDIUM	FINE			
AASHO	GRAVEL			SAND			SILT		CLAY
	COARSE	MEDIUM	FINE	COARSE		FINE			

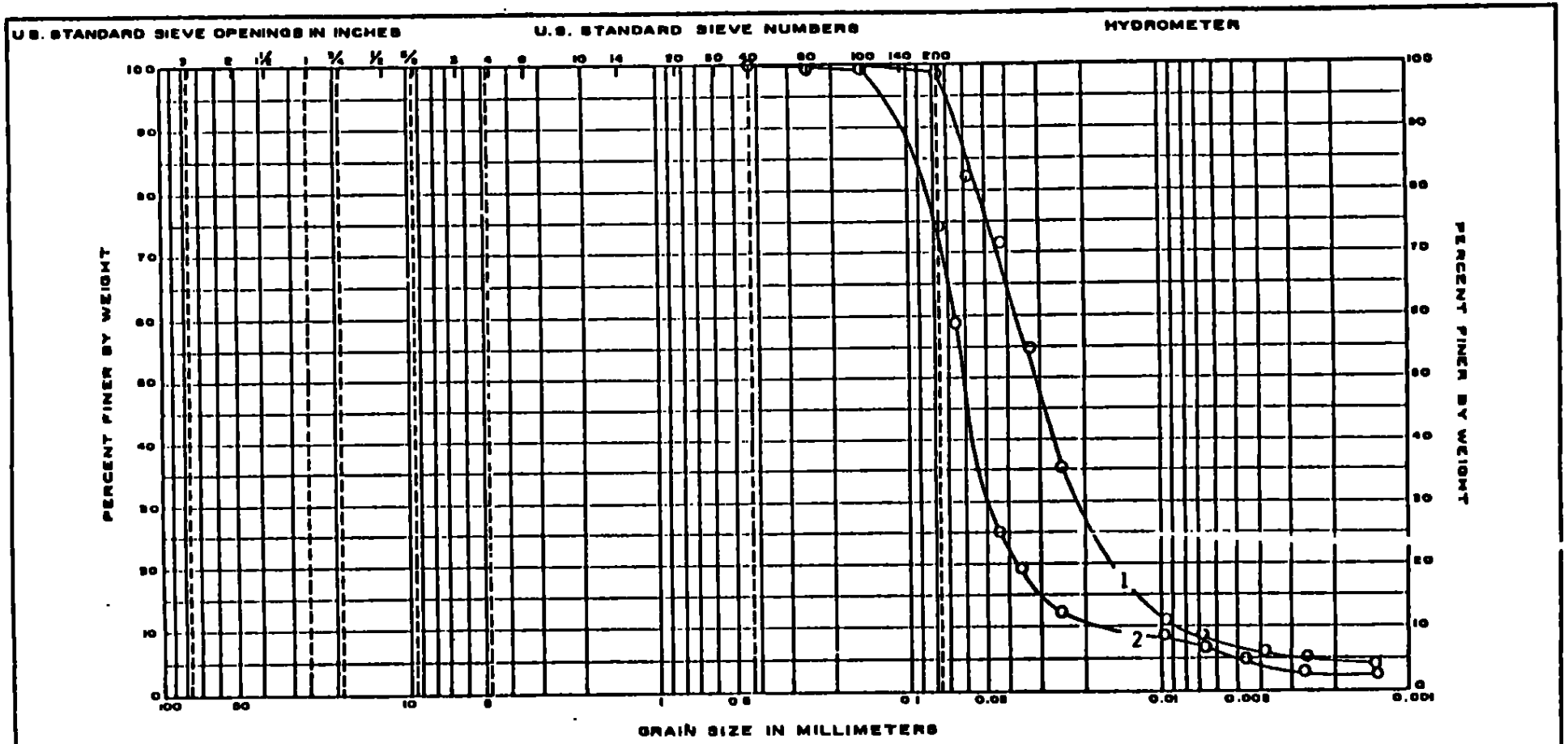
GRAIN SIZE ANALYSIS

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH IN FT.	NATURAL WATER CONTENT	ATTERBERG LIMITS		
					LL	PL	PI
1	1	10	28.5				

PROJECT: Soil Borings & Laboratory Tests
American Cyanamid Company
Sludge Disposal; Fortier Plant
Jefferson Parish, Louisiana
For: Waldemar S. Nelson & Co., Inc.,
Engineers & Architects, New Orleans, La.

EUSTIS ENGINEERING COMPANY
CONSULTING FOUNDATION ENGINEERS
METAIRIE, LA.

Enc. 12



UNIFIED	GRAVEL			SAND			SILT OR CLAY	
	COARSE	FINE		COARSE	MEDIUM	FINE		
AASHO	GRAVEL			SAND			SILT	CLAY
	COARSE	MEDIUM	FINE	COARSE		FINE		

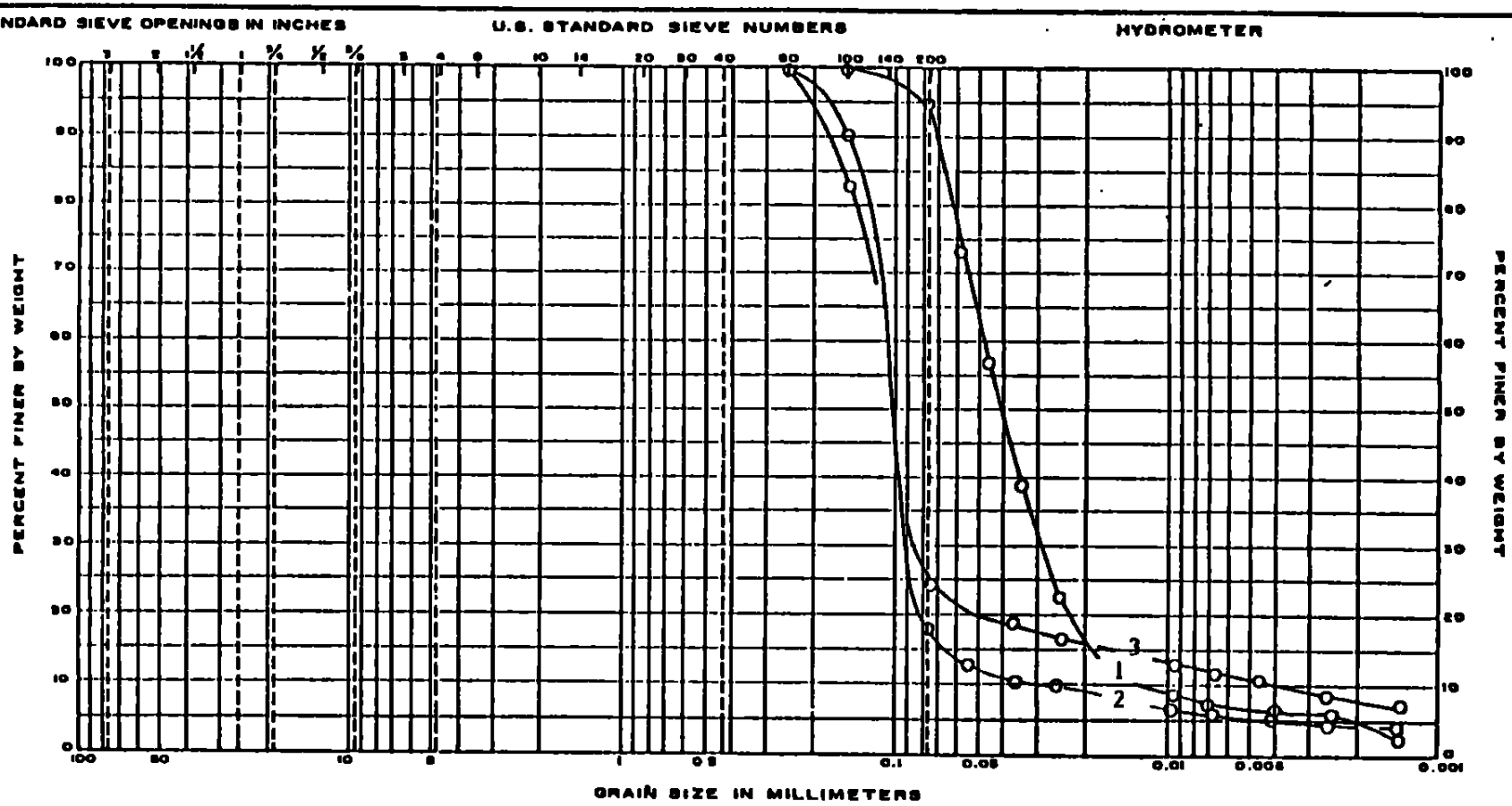
GRAIN SIZE ANALYSIS

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH IN FT.	NATURAL WATER CONTENT	ATTERBERG LIMITS		
					LL	PL	PI
1	2	6	16.5	33.9	30	23	7
2		8	23.5				

PROJECT: Soil Borings & Laboratory Tests
American Cyanamid Company
Sludge Disposal, Fortier Plant
Jefferson Parish, Louisiana
For: Waldemar S. Nelson & Co., Inc.,
Engineers & Architects, New Orleans, La.

EUSTIS ENGINEERING COMPANY
CONSULTING FOUNDATION ENGINEERS
METAIRIE, LA.

Enc. 13



UNIFIED	GRAVEL			SAND			SILT OR CLAY	
	COARSE	FINE		COARSE	MEDIUM	FINE		
AASHO	GRAVEL			SAND			SILT	CLAY
	COARSE	MEDIUM	FINE	COARSE		FINE		

GRAIN SIZE ANALYSIS

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH IN FT.	NATURAL WATER CONTENT	ATTERBERG LIMITS		
					LL	PL	PI
1	3	8	23.5	35.8	28	25	3
2		10	28.5				
3		13	36.0				

PROJECT Soil Borings & Laboratory Tests
American Cyanamid Company
Sludge Disposal, Fortier Plant
Jefferson Parish, Louisiana
For: Waldemar S. Nelson & Co., Inc.,
Engineers & Architects, New Orleans, La.

EUSTIS ENGINEERING COMPANY
CONSULTING FOUNDATION ENGINEERS
METAIRIE, LA.

Enc. 14

Boring Group F

EUSTIS ENGINEERING COMPANY
CONSULTING FOUNDATION ENGINEERS
NEW ORLEANS, LA.

LOG OF BORING

Name of Project: American Cyanamid Company - Acrylonitrile Unit
Fortier Plant, Avondale, Louisiana

For: The Badger Company, Engineers-Constructors, Cambridge, Massachusetts

Boring No. 1 Field Engineer F. O. Bragg Date 5 October 1964

Ground Elev. _____ Datum _____ Gr. Water Depth See Text

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*Blows Per Foot
			0.0	1.0	Shell fill	
1	2.5	3.0	1.0		Medium stiff tan & gray clay	
2	5.5	6.0		7.0	Ditto	
3	8.5	9.0	7.0	9.5	Soft tan & gray clay	
4	11.5	12.0	9.5		Soft gray silty clay w/silt layers	
5	14.5	15.0			Ditto	
6	19.5	20.0		20.0	Ditto	
7	24.5	25.0	20.0	27.0	Soft gray clay w/silt layers	
8	29.5	30.0	27.0		Loose gray clayey silt	
9	34.5	35.0		37.0	Ditto	
10	39.5	40.0	37.0		Medium stiff gray clay w/sandy silt layers	
11	44.5	45.0		48.0	Ditto	
12	49.5	50.0	48.0		Soft to medium stiff gray clay w/silt lenses	
13	54.5	55.0		58.0	Ditto.	
14	58.5	60.0	58.0		Medium dense gray fine sand w/clay layers	3 15
15	61.0	62.5		62.0	Ditto	4 17
16	63.5	65.0	62.0	67.0	Medium dense gray fine sand	12 30
17	68.5	70.0	67.0		Dense to very dense gray fine sand	14 30=0.7'
18	73.5	75.0		75.0	Ditto	15 30=0.5'
					Boring located at Coordinates: E 1275 S 2470	

*Number of blows of 140 lb hammer dropped 30 in required to drive 2 in split-spoon sampler 1 ft after first being driven 6 in

Remarks: First number in column headed "Blows per Foot" indicates the number of blows required to seat splitspoon sampler first 6 inches.

CLAY SILT SAND

Predominant · shown heavy Modifying type shown light.

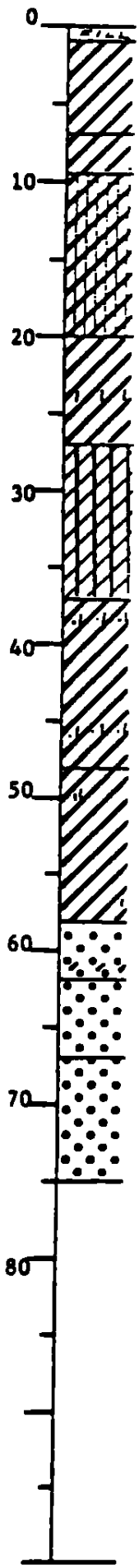


Fig. 3

Subsoil Investigation
American Cyanamid Company
Acrylonitrile Unit
Fortier Plant
Avondale, Louisiana

For: The Badger Company, Engineers-Constructors
Cambridge, Massachusetts

SUMMARY OF LABORATORY TEST RESULTS

BORING 1

Sample No.	Depth in Ft.	Classification	Water Content Percent	Density Lbs./Cu.Ft. Dry	Density Lbs./Cu.Ft. Wet	Unconfined Compressive Strength Lbs./Sq.Ft.
1	2.5	Medium stiff tan & gray clay	40.0	80.8	113.1	1930
2	5.5	*Ditto*	34.8	86.7	116.9	1715
3	8.5	Soft tan & gray clay	49.6	71.5	107.0	825
4	11.5	Soft gray silty clay w/silt layers	34.6	88.1	118.6	960
5	14.5	Soft gray silty clay w/many silt lenses	42.6	77.3	110.2	890
6	19.5	Ditto	46.1	73.1	106.8	490
7	24.5	Soft gray clay w/sandy silt layers	64.2	62.7	103.0	800
8	29.5	Loose gray clayey silt	38.4	81.2	112.4	$\phi=0^{\circ}$ c=300*
9	34.5	Ditto	41.8	75.9	107.6	$\phi=0^{\circ}$ c=160*
10	39.5	Medium stiff gray clay w/sandy silt layers	55.5	67.5	105.0	1550
11	44.5	Ditto	56.7	67.3	105.5	1135
12	49.5	Soft gray clay w/silt lenses	60.8	63.5	102.1	840
13	54.5	Medium stiff gray clay w/silt lenses	62.1	63.2	102.4	1515

*Quick triaxial shear test.

ϕ = Angle of internal friction;
c = Cohesion in pounds per sq. ft.

Fig. 9

EUSTIS ENGINEERING COMPANY
CONSULTING FOUNDATION ENGINEERS
NEW ORLEANS, LA.

LOG OF BORING

Name of Project: American Cyanamid Company - Acrylonitrile Unit
Fortier Plant, Avondale, Louisiana

For: The Badger Company, Engineers-Constructors, Cambridge, Massachusetts

Boring No. 2 Field Engineer F. O. Bragg Date 1 October 1964

Ground Elev. _____ Datum _____ Gr. Water Depth See Text

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*Blows Per Foot
			0.0	1.0	Shell fill	
1	2.5	3.0	1.0		Medium stiff to soft tan & gray clay	
2	5.5	6.0			Ditto	
3	8.5	9.0		10.0	Ditto	
4	11.5	12.0	10.0	12.0	Loose gray clayey silt	
5	14.5	15.0	12.0		Soft gray silty clay w/sandy silt layers	
6	19.5	20.0		23.0	Ditto	
7	24.5	25.0	23.0	27.0	Soft gray clay w/sandy silt layers	
8	29.5	30.0	27.0	33.0	Very soft gray silty clay	
9	34.5	35.0	33.0		Soft gray clay w/sandy silt lenses & layers	
10	39.5	40.0			Ditto	
11	44.5	45.0		48.5	Ditto	
12	49.5	50.0	48.5	52.0	Soft gray clay w/silt lenses	
13	54.5	55.0	52.0	55.0	Soft gray clay w/sand layers	
14	55.0	56.5	55.0	57.5	Medium dense gray sand	2 18
15	57.5	59.0	57.5	60.0	Dense gray sand	30=0.6' (Seat)
16	60.0	61.5	60.0		Medium dense gray sand	13 20
17	63.5	65.0		67.0	Medium dense gray sand w/trace of wood & thin clay layer	8 25
18	68.5	70.0	67.0		Dense gray sand	11 30=0.7'
19	73.5	75.0		75.0	Ditto	13 30=0.7'
					Boring located at Coordinates:	
					E 1180 S 2430	

*Number of blows of 140 lb. hammer dropped 30 in required to drive 1 in split spoon sampler 1 ft after first being driven 6 in

Remarks: First number in column headed "Blows per Foot" indicates the number of blows required to seat splitspoon sampler first 6 inches.

CLAY SILT SAND

Predominant -- shown heavy Modifying type shown light

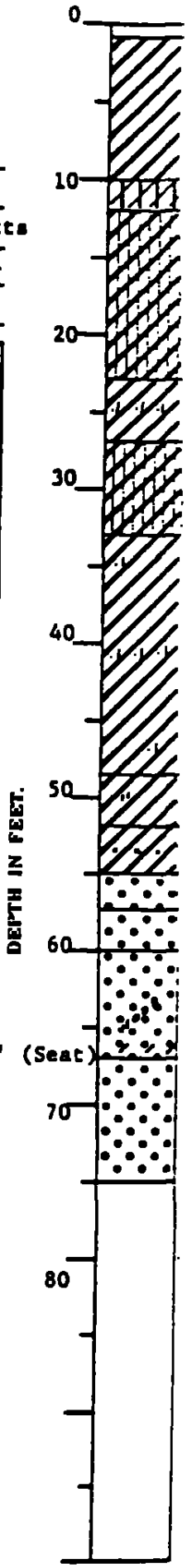


Fig. 4

Subsoil Investigation
American Cyanamid Company
Acrylonitrile Unit
Fortier Plant
Avondale, Louisiana

For: The Badger Company, Engineers-Constructors
Cambridge, Massachusetts

SUMMARY OF LABORATORY TEST RESULTS

BORING 2

Sample No.	Depth in Ft.	Classification	Water Content Percent	Density Lbs./Cu.Ft. Dry	Density Lbs./Cu.Ft. Wet	Unconfined Compressive Strength Lbs./Sq.Ft.	Atterberg Liquid Limits
L	2.5	Medium stiff tan & gray clay	41.3	79.3	112.1	1165	83
2	5.5	Soft tan & gray clay	36.6	84.8	115.8	715	
3	8.5	Medium tan & gray clay	34.9	87.3	117.8	1940	44
4	11.5	Loose gray clayey silt	36.5	84.4	115.2	$\phi=0^{o}$ c=245*	
5	14.5	Soft gray silty clay w/silt layers	44.3	76.7	110.7	775	65
6	19.5	Ditto	62.2	63.1	102.3	645	
7	24.5	Soft gray clay w/sandy silt layers	65.8	60.8	100.8	925	
8	29.5	Very soft gray silty clay	39.8	78.0	109.0	300	
9	34.5	Soft gray clay w/sandy silt layers	57.2	67.6	106.3	790	
10	39.5	Ditto	51.7	66.1	107.9	640	
12	49.5	Soft gray clay w/silt lenses	65.9	61.2	101.3	820	

Fig. 10

EUSTIS ENGINEERING COMPANY
CONSULTING FOUNDATION ENGINEERS
NEW ORLEANS, LA.

LOG OF BORING

Name of Project: American Cyanamid Company - Acrylonitrile Unit
Fortier Plant, Avondale, Louisiana

For: The Badger Company, Engineers-Constructors, Cambridge, Massachusetts

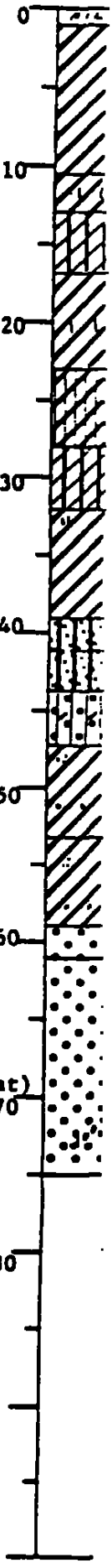
Boring No. 3 Field Engineer F. O. Bragg Date 1 October 1964

Ground Elev. _____ Datum _____ Gr. Water Depth See Text

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*Blows Per Foot
			0.0	1.0	Shell fill	
1	2.5	3.0	1.0		Medium stiff gray & tan clay	
2	5.5	6.0			Ditto	
3	8.5	9.0		10.5	Ditto	
4	11.5	12.0	10.5	13.0	Stiff gray clay w/sandy silt layers	
5	14.5	15.0	13.0	17.0	Loose gray clayey silt	
6	19.5	20.0	17.0	23.0	Soft gray clay w/silt layers	
7	24.5	25.0	23.0	28.0	Soft gray silty clay	
8	29.5	30.0	28.0	32.0	Loose gray clayey silt	
9	34.5	35.0	32.0	39.0	Medium stiff gray clay w/silt lenses	
10	39.0	40.5	39.0	41.0	Medium compact gray sandy silt	7 16
11	41.0	42.5	41.0	43.5	Loose gray sandy silt	7 8
12	43.5	45.0	43.5	47.0	Loose gray silty sand w/clay layers	7 8
13	49.5	50.0	47.0	53.0	Soft gray clay w/sand lenses & layers	
14	54.5	55.0	53.0	59.0	Medium stiff gray clay w/sand lenses & layers	
15	59.0	60.5	59.0	61.0	Medium dense gray sand	12 30
16	61.5	63.0	61.0		Very dense gray fine sand	30=0.6'
17	64.0	65.5			Ditto	18 30=0.6'
18	68.5	70.0			Ditto	17 30=0.5'
19	73.5	75.0		75.0	Very dense gray fine sand w/trace of wood	17 30=0.6'
					Boring located at Coordinates: E 1100 S 2470	

*Number of blows of 140 lb hammer dropped 30 in required to drive 2 in split-spoon sampler 1 ft after first being driven 6 in

Remarks: First number in column headed "Blows per Foot" indicates the number of blows required to seat splitspoon sampler first 6 inches.



CLAY SILT SAND

Predominant type shown heavy Modifying type shown light.

Fig.

Subsoil Investigation
American Cyanamid Company
Acrylonitrile Unit
Fortier Plant
Avondale, Louisiana

For: The Badger Company, Engineers-Constructors
Cambridge, Massachusetts

SUMMARY OF LABORATORY TEST RESULTS

BORING 3

Sample No.	Depth in Ft.	Classification	Water Content Percent	Density Lbs./Cu.Ft. Dry	Density Lbs./Cu.Ft. Wet	Unconfined Compressive Strength Lbs./Sq.Ft.
1	2.5	Medium stiff gray & tan clay	36.6	83.4	113.9	1425
2	5.5	Ditto	43.4	77.4	111.0	1150
3	8.5	Ditto	48.3	74.5	110.5	1200
4	11.5	Stiff gray clay w/sandy silt layers	38.3	82.9	114.7	2050
5	14.5	Loose gray clayey silt	34.1	84.1	112.8	$\emptyset=5^{\circ}c=0$*
6	19.5	Soft gray clay w/silt layers	61.3	64.9	104.7	745
7	24.5	Soft gray silty clay	42.5	78.3	111.6	715
8	29.5	Very loose gray clayey silt	37.2	83.0	113.7	$\emptyset=0^{\circ}c=125$*
9	34.5	Medium stiff gray clay w/silt lenses	57.2	64.3	106.5	1175
13	49.5	Soft gray clay w/sand lenses	64.1	61.5	100.9	565
14	54.5	Medium stiff gray clay w/sand lenses	47.7	73.5	108.6	1500

*Quick triaxial shear test.

$\emptyset$ = Angle of internal friction.

c = Cohesion in pounds per sq. ft.

Fig. 11

EUSTIS ENGINEERING COMPANY
CONSULTING FOUNDATION ENGINEERS
NEW ORLEANS, LA.

LOG OF BORING

Name of Project: American Cyanamid Company, Acrylonitrile Unit
Fortier Plant, Avondale, Louisiana

For: The Badger Company, Engineers-Constructors, Cambridge, Massachusetts

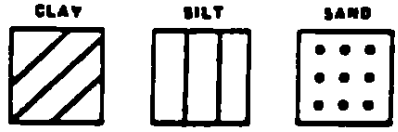
Boring No. 4 Field Engineer F. O. Bragg Date 5 October 1964

Ground Elev. _____ Datum _____ Gr. Water Depth See Text

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*Blows Per Foot
1	2.5	3.0	0.0		Medium stiff tan & gray clay	
2	5.5	6.0			Ditto	
3	8.5	9.0		9.5	Ditto	
4	11.5	12.0	9.5		Soft to medium stiff gray silty clay	
					w/sandy silt layers	
5	14.5	15.0			Ditto	
6	19.5	20.0		22.0	Ditto	
7	24.5	25.0	22.0		Medium stiff gray clay w/silt layers	
8	29.5	30.0		33.0	Ditto	
9	34.5	35.0	33.0	38.0	Very soft gray silty clay w/silt layers	
10	39.5	40.0	38.0		Stiff to medium stiff gray clay w/silty	
					sand layers	
11	44.5	45.0		47.0	Ditto	
12	49.5	50.0	47.0	54.0	Soft gray clay w/silt lenses	
13	54.0	55.5	54.0	56.5	Medium dense gray silty sand	8 24
14	56.5	58.0	56.5		Very dense gray fine sand	12 30=0.6'
15	59.5	61.0		63.5	Ditto	14 30=0.6'
16	63.5	65.0	63.5	68.5	Medium dense gray fine sand	9 26
17	68.5	70.0	68.5		Very dense gray fine sand	30=0.6'
18	74.5	75.0		75.0	Ditto	30=0.5'
					Boring located at Coordinates:	
					E 1275 S 2340	

*Number of blows of 140 lb hammer dropped 30 in required to drive 1 in split-spoon sampler 1 ft after first being driven 6 in

Remarks: First number in column headed "Blows per Foot" indicates the number of blows required to seat splitspoon sampler first 6 inches.



Predominant type shown heavy Modifying type shown light.

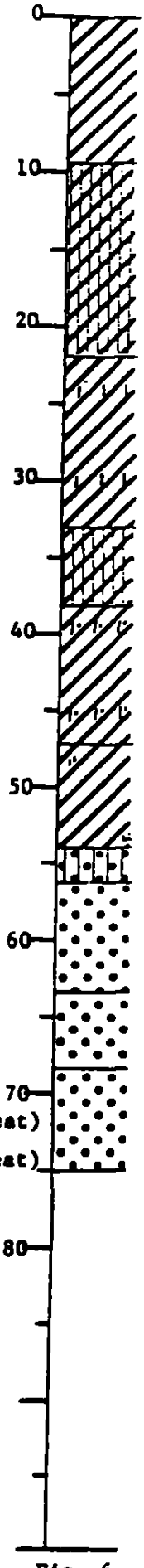


Fig. 6

Subsoil Investigation
American Cyanamid Company
Acrylonitrile Unit
Fortier Plant
Avondale, Louisiana

For: The Badger Company, Engineers-Constructors
Cambridge, Massachusetts

SUMMARY OF LABORATORY TEST RESULTS

BORING 4

Sample No.	Depth in Ft.	Classification	Water Content Percent	Density Lbs./Cu.Ft. Dry	Density Lbs./Cu.Ft. Wet	Unconfined Compressive Strength Lbs./Sq.Ft.	Atterberg Liquid Limits
1	2.5	Medium stiff tan & gray clay	34.3	86.7	116.4	1675	
2	5.5	Ditto	39.0	82.1	114.1	1550	63
3	8.5	Ditto	43.7	77.5	111.4	1015	
4	11.5	Medium stiff gray silty clay w/sandy silt layers	34.9	86.7	117.0	1250	
5	14.5	Soft gray silty clay w/sandy silt layers	38.9	81.8	113.6	705	37
6	19.5	Medium stiff gray silty clay w/sandy silt layers	36.0	83.6	113.7	1025	
7	24.5	Medium stiff gray clay w/silt layers	62.5	63.4	103.0	1195	
8	29.5	Ditto	74.6	56.5	98.6	107.5	72
9	34.5	Very soft gray silty clay w/silt layers	48.0	75.4	115.6	425	
10	39.5	Stiff gray clay w/sandy silt layers	57.3	66.3	104.3	2120	
11	44.5	Medium stiff gray clay w/sandy silt layers	41.6	78.9	111.7	1855	
12	49.5	Soft gray clay w/silt lenses	64.6	63.0	103.7	855	

Fig. 12

EUSTIS ENGINEERING COMPANY
CONSULTING FOUNDATION ENGINEERS
NEW ORLEANS, LA.

LOG OF BORING

Name of Project: American Cyanamid Company, Acrylonitrile Unit
Fortier Plant, Avondale, Louisiana

For: The Badger Company, Engineers-Constructors, Cambridge, Massachusetts

Boring No. 5 Field Engineer F. O. Bragg Date 6 October 1964

Ground Elev. _____ Datum _____ Gr. Water Depth See Text

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*Blows Per Foot
			0.0	1.0	Shell & clay fill	
1	2.5	3.0	1.0		Soft to medium stiff tan & gray clay	
2	5.5	6.0			Ditto	
3	8.5	9.0		9.5	Ditto	
4	11.5	12.0	9.5		Soft to medium stiff gray silty clay	
5	14.5	15.0			Ditto	
6	19.5	20.0		21.0	Ditto	
7	24.5	25.0	21.0		Soft gray clay w/silt layers	
8	29.5	30.0			Ditto	
9	34.5	35.0		37.0	Medium stiff gray clay w/silt layers	
10	39.5	40.0	37.0		Medium stiff gray clay w/sandy silt layers	
11	44.5	45.0		47.0	Ditto	
12	49.5	50.0	47.0		Medium stiff gray clay w/sand lenses	
13	54.5	55.0		56.0	Ditto	
14	59.5	60.0	56.0		Soft to medium stiff gray clay w/silt lenses	
15	64.5	65.0		68.0	Ditto	
16	69.5	70.0	68.0	72.0	Stiff gray clay w/silt lenses	
17	74.5	75.0	72.0	75.0	Medium stiff gray silty clay	
					Boring located at Coordinates:	
					E 1400 S 2610	

*Number of blows of 140 lb hammer dropped 30 in required to drive 2 in split-spoon sampler 1 ft after first boring driven 6 in

Remarks: _____

CLAY SILT SAND

Predominant type shown heavy Modifying type shown light

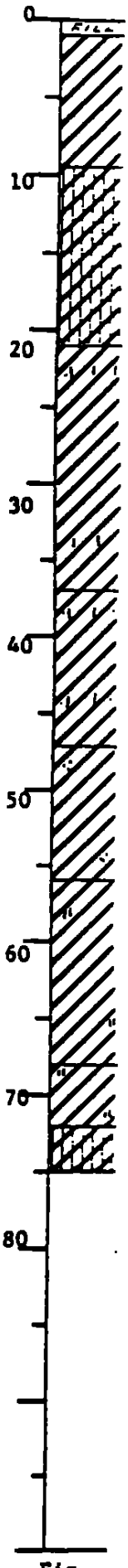


Fig.

Subsoil Investigation
American Cyanamid Company
Acrylonitrile Unit
Fortier Plant
Avondale, Louisiana

For: The Badger Company, Engineers-Constructors
Cambridge, Massachusetts

SUMMARY OF LABORATORY TEST RESULTS

BORING 5

Sample No.	Depth in Ft.	Classification	Water Content Percent	Density Lbs./Cu.Ft. Dry	Density Lbs./Cu.Ft. Wet	Unconfined Compressive Strength Lbs./Sq.Ft.
1	2.5	Soft tan & gray clay	45.1	74.9	108.7	840
2	5.5	Medium stiff tan & gray clay	41.8	80.0	113.4	1405
3	8.5	Ditto	41.0	80.0	112.8	1210
4	11.5	Medium stiff gray silty clay	37.5	83.6	115.0	1095
5	14.5	Soft gray silty clay	41.1	79.7	112.4	910
6	19.5	Ditto	46.0	74.5	108.8	820
7	24.5	Soft gray clay w/silt layers	73.0	56.7	98.0	625
8	29.5	Ditto	41.1	78.4	110.6	875
9	34.5	Medium stiff gray clay w/silt layers	68.4	59.0	99.4	1055
10	39.5	Medium stiff gray clay w/sandy silt layers	51.5	70.0	106.4	1050
11	44.5	Ditto	55.6	66.8	103.9	1055
12	49.5	Medium stiff gray clay w/sand lenses	64.2		100.6	1235
13	54.5	Ditto	64.0	61.6	103.4	1495
14	59.5	Medium stiff gray clay w/silt lenses	54.9	67.4	102.4	1295
15	64.5	Soft gray clay w/silt lenses	56.8	66.4	104.1	865
16	69.5	Stiff gray clay w/silt lenses	57.0	66.4	104.2	2860
17	74.5	Medium stiff gray silty clay	35.1	80.4	108.6	1635

Fig. 13

EUSTIS ENGINEERING COMPANY
CONSULTING FOUNDATION ENGINEERS
NEW ORLEANS, LA.

LOG OF BORING

Name of Project: American Cyanamid Company - Acrylonitrile Unit
Fortier Plant, Avondale, Louisiana

For: The Badger Company, Engineers-Constructors, Cambridge, Massachusetts

Boring No. 6 Field Engineer F. O. Bragg Date 5 & 6 October 1964

Ground Elev. _____ Datum _____ Gr. Water Depth See Text

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*Blows Per Foot
1	2.5	3.0	0.0		Soft to medium stiff tan & gray clay	
2	5.5	6.0			Ditto	
3	8.5	9.0		9.5	Ditto	
4	11.5	12.0	9.5	12.0	Medium stiff gray clay	
5	14.5	15.0	12.0	17.0	Soft gray silty clay	
6	19.5	20.0	17.0	22.0	Very soft gray silty clay	
7	24.5	25.0	22.0	27.5	Very soft gray clay w/silt layers	
8	29.5	30.0	27.5	32.0	Medium stiff gray clay w/silt lenses	
9	34.5	35.0	32.0	38.0	Soft gray clay w/sandy silt layers	
10	39.5	40.0	38.0	41.0	Loose gray silty sand w/clay layers	
11	44.5	45.0	41.0		Soft to medium stiff gray clay w/silt lenses	
12	49.5	50.0		50.0	Ditto	
13	54.5	55.0	50.0		Medium stiff gray clay w/sand lenses & layers	
14	59.5	60.0		62.0	Ditto	
15	62.0	63.5	62.0		Loose gray silty sand	2 9
16	65.0	66.5		68.5	Ditto	5 12
17	68.5	70.0	68.5	72.5	Stiff gray & brown clay	5 11
18	72.5	74.0	72.5	75.0	Medium dense gray fine sand	5 22
19	75.0	76.5	75.0	78.5	Dense gray fine sand	12 30=0.8'
20	78.5	80.0	78.5	80.0	Stiff gray clay w/silt lenses	8 27
					Boring located at Coordinates:	
					E 1230 S 2580	

*Number of blows of 140 lb hammer dropped 30 in required to drive 2 in split spoon sampler 1 ft after first being driven 6 in

Remarks: First number in column headed "Blows per Foot" indicates the number of blows required to seat splitspoon sampler first 6 inches.

CLAY SILT SAND

Predominant type shown heavy Modifying type shown light

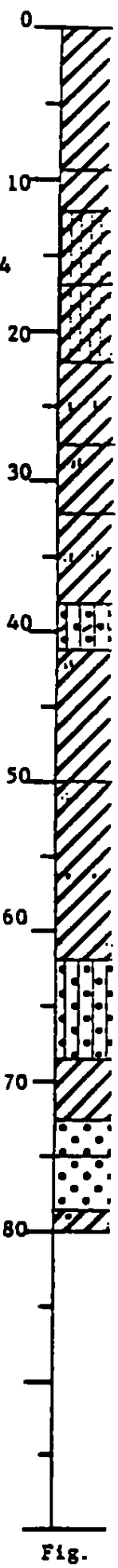


Fig.

Subsoil Investigation
American Cyanamid Company
Acrylonitrile Unit
Fortier Plant
Avondale, Louisiana

For: The Badger Company, Engineers-Constructors
Cambridge, Massachusetts

SUMMARY OF LABORATORY TEST RESULTS

BORING 6

Sample No.	Depth in Ft.	Classification	Water Content Percent	Density Lbs./Cu.Ft. Dry	Density Lbs./Cu.Ft. Wet	Unconfined Compressive Strength Lbs./Sq.Ft.
1	2.5	Medium stiff tan & gray clay	51.4	69.5	105.2	1070
2	5.5	Soft tan & gray clay	46.3	74.1	108.4	550
3	8.5	Ditto	46.1	75.1	109.7	990
4	11.5	Medium stiff gray clay	45.6	76.7	111.7	1330
5	14.5	Soft gray silty clay	42.1	78.3	112.3	840
6	19.5	Very soft gray silty clay	38.7	81.0	112.3	475
7	24.5	Very soft gray clay w/silt layers	56.0	66.0	103.0	480
8	29.5	Medium stiff gray clay w/silt lenses	67.0	60.2	100.5	1365
9	34.5	Soft gray clay w/sandy silt layers	48.4	72.8	108.0	800
11	44.5	Medium stiff gray clay w/silt lenses	61.9	62.9	101.8	1205
12	49.5	Soft gray clay w/silt lenses	61.6	63.2	102.1	985
13	54.5	Medium stiff gray clay w/sand lenses	51.7	69.8	105.9	1085
14	59.5	Ditto	50.4	70.4	105.9	1865

Fig. 14

Boring Group G

EUSTIS ENGINEERING COMPANY

NEW ORLEANS, LA

LOG OF BORING

Name of Project: American Cyanamid Company - MAA Plant

Fortier Plant, Jefferson Parish, Louisiana

For: American Cyanamid Company, Jefferson Parish, Louisiana

Boring No. 1 Field Engineer F. O. Bragg Date 15 May 1963

Ground Elev. Datum Gr. Water

Sample No.	Sample Depth From	Sample Depth To	Stratum Depth From	Stratum Depth To	Visual Classification	Blows per Foot	Rec.
			0.0	0.3	Compact shell fill		
1	2.5	3.0	0.3	4.0	Very stiff gray & tan clay w/trace of organic matter		
2	5.5	6.0	4.0		Stiff gray & tan clay w/trace of organic matter		
3	8.5	9.0		10.0	Ditto		
4	11.5	12.0	10.0	13.0	Medium compact gray sandy silt		
5	14.5	15.0	13.0	18.0	Medium stiff gray silty clay w/sandy silt layers		
6	19.5	20.0	18.0	22.0	Soft gray silty clay w/silt layers		
7	24.5	25.0	22.0	28.0	Soft gray & tan clay w/sandy silt layers		
8	29.5	30.0	28.0	37.5	Medium compact gray sandy silt w/silty sand layers		
9	37.5	38.0	37.5		Medium dense gray silty sand		
10	38.0	39.5		39.5	Ditto	4	15
11	41.0	42.5	39.5	43.0	Medium stiff gray clay	5	8
12	44.5	45.0	43.0	45.5	Loose gray sandy silt		
13	46.0	47.5	45.5	48.0	Loose gray fine sand	1	8
14	48.5	49.0	48.0	49.5	Soft gray clay w/silty sand layers		
15	49.5	51.0	49.5	52.0	Medium dense gray fine silty sand	2	27
16	52.0	53.5	52.0	53.5	Dense gray fine silty sand	14 30=0.6'	
17	55.0	56.5	53.5	58.5	Medium dense gray & tan fine sand	5	20
18	58.5	60.0	58.5		Dense gray & tan fine sand	6 30=0.7'	
19	63.5	65.0			Ditto	14 30=0.6'	
20	68.5	70.0			Ditto	16 30=0.6'	
21	73.5	75.0		75.0	Dense gray & tan fine sand w/few shells	6	30

Remarks: Boring coordinates: E 1500, S 2418.
First number in column headed "Blows per Foot" indicates the number of blows required to seat split-spoon sampler first 6 inches.

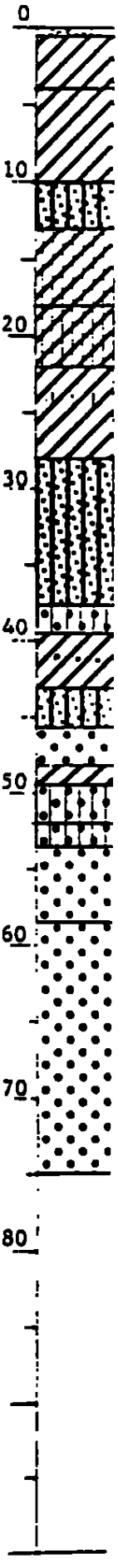


Fig.

EUSTIS ENGINEERING COMPANY

CONSULTING FOUNDATION ENGINEERS

NEW ORLEANS, LA.

LOG OF BORING

Name of Project: American Cyanamid Company - MAA Plant

Fortier Plant, Jefferson Parish, Louisiana

For: American Cyanamid Company, Jefferson Parish, Louisiana

Boring No. 2A Field Engineer F. O. Bragg Date 15 May 1963

Ground Elev. ——— Datum ——— Gr. Water ———

Sample No.	Sample Depth Feet From	Sample Depth Feet To	Stratum Depth Feet From	Stratum Depth Feet To	Visual Classification	Blows per Foot	Water Content %
			0.0	0.4	Compact shell fill		
1	2.5	3.0	0.4		Stiff gray & tan clay w/trace of organic matter		
2	5.5	6.0		7.5	Stiff gray & tan clay w/thin silt layer		
3	8.5	9.0	7.5	10.5	Medium stiff gray & tan clay w/silt lenses		
4	11.5	12.0	10.5		Soft gray silty clay w/clayey silt layers		
5	14.5	15.0		17.5	Ditto		
6	19.5	20.0	17.5	22.0	Soft gray silty clay w/sandy silt layers		
7	24.5	25.0	22.0	26.0	Medium stiff gray & tan clay w/sandy silt layers		
8	28.5	29.0	26.0	29.0	Medium compact gray clayey silt		
9	29.0	30.5	29.0		Medium dense gray fine silty sand with clay layers	5	13
10	32.5	34.0		34.0	Ditto	2	13
11	36.5	37.0	34.0	37.0	Alternate layers of gray silty clay & clayey silt		
12	37.0	38.5	37.0		Medium dense gray fine silty sand	8	22
13	40.0	41.5		43.5	Ditto	9	26
14	43.5	45.0	43.5		Medium stiff gray clay w/sand layers	7	13
15	46.5	47.0		47.0	Ditto		
16	47.0	48.5	47.0	49.5	Loose gray fine sand	2	8
17	49.5	51.0	49.5		Medium dense gray & tan fine sand	8	22
18	53.5	55.0		58.5	Ditto	8	27

Remarks: Boring coordinates: E 1500, S 2368.

First number in column headed "Blows per Foot" indicates the number of blows required to seat split-spoon sampler first 6 inches.

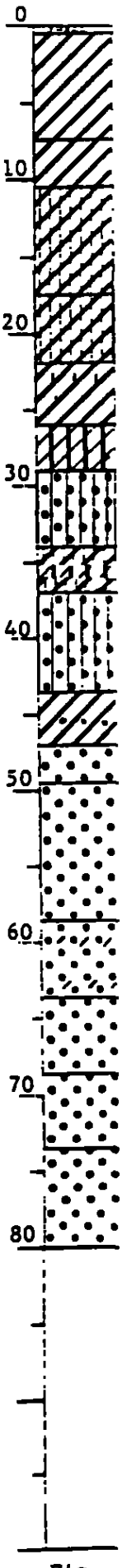


Fig.

(Sheet #

EUSTIS ENGINEERING COMPANY
CONSULTING FOUNDATION ENGINEERS
NEW ORLEANS, LA

Sheet 2 of 2

LOG OF BORING

Name of Project: American Cyanamid Company - MAA Plant
Fortier Plant, Jefferson Parish, Louisiana
For: American Cyanamid Company, Jefferson Parish, Louisiana

Boring No. 2A (con't) Field Engineer F. O. Bragg Date 15 May 1963
Ground Elev. Datum Gr. Water

Sample No.	Sample Depth - Feet From	Sample Depth - Feet To	Stratum Depth - Feet From	Stratum Depth - Feet To	Visual Classification	Blows per Foot
19	58.5	60.0	58.5	63.5	Loose gray & tan fine sand w/clay layers	5 8 17
20	63.5	65.0	63.5	68.5	Very dense gray & tan fine sand	30=0.5'
21	68.5	70.0	68.5	73.5	Medium dense gray & tan fine sand	6 22 20
22	73.5	75.0	73.5		Very dense gray & tan fine sand	30=0.4'
23	78.5	80.0	80.0		Ditto	14 30=0.5'

Remarks: Boring coordinates: E 1500, S 2368.
First number in column headed "Blows per Foot" indicates the number of blows required to seat split-spoon sampler first 6 inches.

Fig.
(Sheet

Subsoil Investigation
MAA Plant
American Cyanamid Company
Fortier Plant
Jefferson Parish, Louisiana

For: American Cyanamid Co., Jefferson Parish, Louisiana

SUMMARY OF LABORATORY TESTS ON SELECTED UNDISTURBED SAMPLES

BORING 1

Sample No.	Depth in Ft.	Classification	Water Content Percent	Density Lbs./Cu.Ft. Dry	Density Lbs./Cu.Ft. Wet	Unconfined Compressive Strength Lbs./Sq.Ft.
1	2.5	Very stiff gray & tan clay with trace of organic matter	23.5	96.9	119.7	5810
2	5.5	Stiff gray & tan clay w/trace of organic matter	37.9	83.7	115.4	2210
3	8.5	Ditto	35.6	85.6	116.1	2325
4	11.5	Medium compact gray sandy silt	29.6	89.5	116.0	$\emptyset=21^{\circ}$ c=605*
5	14.5	Medium stiff gray silty clay with sandy silt layers	41.6	80.0	113.3	1350
6	19.5	Soft gray silty clay w/silt layers	38.5	83.2	115.2	660
7	24.5	Soft gray clay w/sandy silt lenses	61.6	63.7	102.9	835
8	29.5	Medium compact gray sandy silt w/silty sand layers	34.2	86.7	116.4	$\emptyset=10^{\circ}$ c=490*
9	37.5	Medium dense gray silty sand	28.0	90.8	116.2	$\emptyset=30^{\circ}$ c=0*
12	44.5	Loose gray sandy silt	34.8	84.5	113.9	$\emptyset=5^{\circ}$ c=290*
14	48.5	Soft gray clay w/silty sand layers	38.3	80.9	111.9	525

BORING 2A

1	2.5	Stiff gray & tan clay w/trace of organic matter	31.5	90.1	118.5	3090
2	5.5	Stiff gray & tan clay w/silt lenses	39.5	82.0	114.4	2200
3	8.5	Medium stiff gray & tan clay with silt lenses	40.7	80.8	113.7	1790
4	11.5	Soft gray silty clay w/clayey silt layers	40.9	80.6	113.6	985
5	14.5	Soft gray silty clay w/clayey silt layers	35.0	86.7	117.0	830
6	19.5	Soft gray silty clay w/sandy silt layers	42.2	79.4	112.9	755
7	24.5	Medium stiff gray & tan clay with sandy silt layers	65.0	61.6	101.6	1270
8	28.5	Medium compact gray clayey silt	27.3	95.0	120.9	$\emptyset=17^{\circ}$ c=460*
11	36.5	Alternate layers medium compact gray clay, silt & silty clay w/sand lenses	27.5	95.2	121.4	$\emptyset=20^{\circ}$ c=650*
15	46.5	Medium stiff gray clay w/fine sand layers	48.3	73.4	108.9	1020

*Quick triaxial shear test. $\emptyset$=Angle of internal friction; c=Cohesion in lbs./Sq.Ft.

Fig. 4